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A THOMSON BRAND

Spirit 4K / 2K

High-Performance Film Scanner SFS 4000
DataCine SDC 4000 / SDC 2048

Operating Instructions

Software Release V3.0.0

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1. GENERAL

1.1 PREFACE

1.1.1 ABOUT THIS MANUAL

Operating Instructions is the second part in a set of two parts of the Customer's Manual.

This part informs the user about the **Spirit 2K** and **Spirit 4K** Film Scanner / DataCine operation procedures and routine maintenance.

NOTE!
Technical information in this document is subject to change without notice.

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All brand and product names are trademarks of their respective companies.

1.1.2 DOCUMENTATION SET

The **Spirit 2K** and **Spirit 4K** Film Scanner / DataCine documentation set consists:

- Customer's Manual
  with Planning and Installation Guide and Operating Instructions

- Release Notes

The **Customer's Manual** contains in part 1 information about installing, configuring of the system. It contains also technical background information about the Spirit 4K Scanner / DataCine and describes in part 2 operating procedures and routine maintenance. This manual can be used while learning about Spirit 4K / 4K and to enhance basic knowledge of the system.

The **Release Notes** contain information about new features and system enhancements for a specific software version, and also includes software installation procedures. Always check release notes for current system software before you begin operating the system.

1.2 VALIDITY INFORMATION

This manual is valid for the following equipment types:

- Spirit 2K DataCine SDC 2048
- Spirit 4K Film Scanner SFS 4000
- Spirit 4K DataCine SDC 4000

Special features and operating modes available at the Spirt 4K versions only are marked with the SPIRIT 4K logo at the margin of the each respective manual page.

1.3 SOFTWARE STATE

1.3.1 SPIRIT 4K / 2K OPERATING SOFTWARE

Refer the attached Release Note obout the current software states.

1.3.2 TELECINE CONTROLLERS

Telecine Controller support is in preparation for the following systems

- Pandora Platinum
- Da Vinci “Mainframe 2k”

1.4 SAFETY SUMMARY

Read and follow the important safety information below, noting especially those instructions related to risk of fire, electric shock or injury to persons. Additional specific warnings not listed here may be found throughout the manual.

WARNING!
Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

1.4.1 SAFETY TERMS AND SYMBOLS

1.4.1.1 Terms in this Manual

Safety-related statements may appear in this manual in the following manner:

WARNING!
Warning statements identify conditions or practices that may result in personal injury or loss of life.

CAUTION!
Caution statements identify conditions or practices that may result in damage to equipment or other property, or which may cause equipment crucial to your business environment to become temporarily non-operational.

1.4.1.2 Terms on the Product

The following terms may appear on the product:

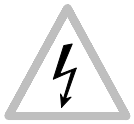
DANGER!
A personal injury hazard is immediately accessible as you read the marking.

WARNING!
A personal injury hazard exists but is not immediately accessible as you read the marking.

CAUTION!
A hazard to property, product, and other equipment is present.

1.4.1.3 Symbols on the Product

The following symbols may appear on the product:



Indicates that dangerous high voltage is present within the equipment enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

Indicates that user, operator or service technician should refer to product manual(s) for important operating, maintenance, or service instructions.

This is a prompt to note fuse rating when replacing fuse(s). The fuse referenced in the text must be replaced with one having the ratings indicated.

Identifies a protective grounding terminal which must be connected to earth ground prior to making any other equipment connections.

Identifies an external protective grounding terminal which may be connected to earth ground as a supplement to an internal grounding terminal.

Indicates that static sensitive components are present which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Class 1
LASER PRODUCT
Eye-safe

Safety instruction concerning GSN Interface:
The laser transceiver, used in this unit, is classified as AEL Class 1 (U.S. 21 CFR(J) and /AEL Class 1 per EN 60825-1 (+A11) and is eye safe.

1.4.2 WARNINGS

The Sprit 4K / 2K is designed in conformity with the safety regulations ANSI / UL / EN 60950 and is in a faultless condition when leaving the factory. In order to maintain this condition and to ensure safe operation, the instructions in the manual have to be observed.

The following warning statements identify conditions or practices that can result in personal injury or loss of life.

- Mount the film scanner on concrete or other non-combustible surface only!
- **Use proper lift points** – Do not use door latches to lift or move equipment.
- **Use only in dry environment** – Do not operate in wet or damp conditions.
- **Use only in non-explosive environment** – Do not operate this product in an explosive atmosphere.
- **Secure the film scanner against sliding.**
  Loosen off the 4 screwed stand feet of the film scanner using a 17-mm wrench, until the transport wheels are released.
- **Protect eyes and skin** – High-intensive ultraviolet energy exits within the illumination path, generated by the Xenon projection lamp.
- **Dangerous voltage or current may be present** – Disconnect power and remove battery (if applicable) before removing protective panels, soldering, or replacing components.
- **Do not service alone** – Do not internally service this product unless another person capable of rendering first aid and resuscitation is present.
- **Remove jewelry** – Prior to servicing, remove jewelry such as rings, watches, and other metallic objects.
- **Avoid exposed circuitry** – Do not touch exposed connections, components or circuitry when power is present.
- **Use proper power cord** – Use only the power cord supplied or specified for this product.
- **Ground product** – Connect the grounding conductor of the power cord to earth ground. When setting up and connecting the film scanner, connect the earth line **always** before connecting the power line. Thus is ensured that in case of a short-circuit between mains and case, the current is led to earth. For this reason, **never** disconnect the earth line from the device while it is operated.
- **Operate only with covers and enclosure panels in place** – Do not operate this product when covers or enclosure panels are removed.
- **Use correct fuse** – To reduce the risk of fire replace only with the same type and rating of fuse. Never use a mended fuse! Do not short-circuit the fuse holder!
- **Double pole neutral fusing** – Disconnect mains power prior to servicing.
  Caution! The rear service AC Out socket is a double-pole neutral fusing. After operation (breaking) of the protective device, one line can remain under voltage!
- **High leakage current may be present** – Earth connection of product is essential before connecting power.

- **Danger of injury!** – To prevent injuries please use only the door handles to open and close the sliging doors.
- **Close filmdeck front door** – When the film scanner is running, always keep the front doors closed, do not touch the rotating film deck parts. The closed front doors protect against fluttering film ends in the event of a film break.
  During operation, the filmdeck front doors are secured with an automatic locking mechanism:

Front doors open:	Film operation up to a fixed speed of maximally 50 frames per second is possible
Front doors closed:	All operation modes are possible
Front doors locked:	At more than 3x the standard speed, closed front doors are locked additionally. The front doors are unlocked as soon as lower shuttle speed is reached again.

- **Danger of injury!** – Do not touch moving mechanism.
- **Keep doors always closed –** To avoid EMC (electromagnetic compatibility) problems keep the rear doors always closed during operation.
  Opening the covers or removing parts with tools may give access to live parts. In such cases, the machine has to be disconnected from the mains.If, for example due to a failure, safe operation of the film scanner is no longer ensured, take the machine out of operation and secure it against further use. Do not insert or remove plug-in cards during operation.
- **Avoid mechanical hazards** – Allow all rotating devices to come to a stop before servicing.
- **Lamp replacement – danger of explosion**.
  Don't use other lamp types than Atlas PE700C13–FMVE.
  Do not reach into the lamp house during operation. Change a defective lamp only when it has cooled down for 30 minutes (risk of getting burnt).

- **Do not use Nitrate–based film material** – The Spirit 4K / 2K film scanner is not designed to be used for nitrate film material. Thomson is not responsible for possible damage to the film material as well as for any subsequent damage resulting therefrom. Nitrate–base film material can be set on fire through electrostatic discharge or when the internal heat protection system fails.
- **Servicing** – All servicing instructions are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any installations other than that contained in the manual unless you are qualified to do so. Refer all servicing to qualified service personnel.
  Access to the inside of the film scanner is restricted by locked front and rear doors. The closed doors protect the operator against electrical and mechanical hazards. Before working on the power supply circuit (power clips, wires, filters, switches, fuses etc.) do disconnect the film scanner from mains. Even if the mains switch is "OFF", the parts of the device are still alive!
  CAUTION! Capacitors may still carry a residual charge for approx. 4 minutes after having switched off the device! If, however, working on the opened machine is inevitable, this has only to be done by an expert who is familiar with the dangers involved.
- The Remote Control Panel GCP1 is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures. The GCP1 has to be used in controlled Electromagnetic Environment E4 of EN 55103 only!

1.4.3 CAUTIONS

The following caution statements identify conditions or practices that can result in damage to equipment or other property:

- **Use correct power source** – Do not operate this product from a power source that applies more than the voltage specified for the product.
- **Use correct voltage setting** – If this product lacks auto-ranging power supplies, before applying power ensure that the each power supply is set to match the power source.
- **Provide proper ventilation** – To prevent product overheating, provide equipment ventilation in accordance with installation instructions.
- **Use anti-static procedures** – Static sensitive components are present which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.
- **Do not operate with suspected equipment failure** – If you suspect product damage or equipment failure, have the equipment inspected by qualified service personnel.
- **Do not operate the Spirit 4K / 2K without Xenon lamp.** In case no lamp is equipped in the lamp house the igniter transformer will get damaged!
- **Ensure mains disconnect** – If mains switch is not provided, the power cord(s) of this equipment provide the means of disconnection. The socket outlet must be installed near the equipment and must be easily accessible. Verify that all mains power is disconnected before installing or removing power supplies and/or options.
- **Use shielded cables** – The EMV regulations are only applicable when correctly shielded cables are used for installation of the equipment. This applies to video cables as well as control cables. Corresponding cables can be obtained from Thomson.
- **Route cable properly** – Route power cords and other cables so that they are not likely to be damaged. Properly support heavy cable bundles to avoid connector damage.
  All external connection cables have to be fed through the “Cable feed-through panel”, located at the rear of the film scanner, and their cable shields have to be connected to the ground by means of the earthing clamps or the sealing tape.
- **Use correct power supply cords** – Power cords for this equipment, if provided, meet all North American electrical codes. Operation of this equipment at voltages exceeding 130 VAC requires power supply cords which comply with NEMA configurations. International power cords, if provided, have the approval of the country of use.
- **Troubleshoot only to board level** — Circuit boards in this product are densely populated with surface mount technology (SMT) components and application specific integrated circuits (FPGAs). As a result, circuit board repair at the component level is very difficult in the field, if not impossible. For warranty compliance, do not troubleshoot systems beyond the board level.

- **Batteries** – The product contains lithium batteries, which have to be exchanged every five years.
  Caution! Danger of explosion if battery is incorrectly replaced (interchanged poles). Replace only with the same or equivalent type recommended by the manufacturer. Dispose used batteries according to the manufacturers instructions.
- **Sensitive touch screen!** Do not use pointed, sharp edged or metallic implements as a stylus, they may damage the sensitive touch screen!
  Use only the Thomson stylus, order no. 1 128 651 046.

2. OPERATING BASICS

Danger of injury! - Do not touch moving mechanism.

Do not use Nitrate-based film material! - The Spirit 4K / 2K is not designed to be used for nitrate film material. Thomson is not responsible for possible damage to the film material as well as for any subsequent damage resulting therefrom. Nitrate-based film material can be set on fire through electrostatic discharge or when the internal heat protection system fails.

CAUTION!
Do not operate the Spirit 4K / 2K without Xenon lamp. In case no lamp is equipped in the lamp house the igniter transformer will get damaged!

2.1 GENERAL DESCRIPTION

The Spirit 4K / 2K is a multi-format, high-resolution, high-speed film scanner. It supports FA 35mm and ACA 35mm film with 2-, 3-, 4-, and 8- (VistaVision) perforations per frame. The front end is an Eastman Kodak designed high-resolution advanced imaging subsystem with

- Diffuse, high power Xenon illumination system to eliminate dust and scratch visibility
- Custom precision optics
- Optical film matching for print, negative and intermediate stocks
- Physical gain control

The native RGB scanning system enables 2K scanning in real-time and 4K scanning at 6-8 fps. The safe continuous motion film transport offers variable scanning speeds and high-speed visible search. The built-in 4K image processing based on a 16-bit-wide RGB data bus consists of:

- Shading correction
- Linear or logarithmic masking
- RGB negative matching
- RGB primary color correction
- Aperture correction

A real-time scaling engine can be used for converting 4K scans to 2K (digital oversampling). The digitized film images are available at an ultra high speed GSN (Gigabyte System Network) output as DPX files conform to SMPTE 268M.

The data transfer characteristic (TV-Gamma, linear, logarithmic, etc.) is selectable with up to 16-bit quantization. Image monitoring signals for a graphics monitor are provided with selectable display LUTs (Look-Up-Tables) and up to SXGA resolution.

Image monitoring is available with selectable LUTs a graphics monitor in up to SXGA resolution. Various modes of signal monitoring is as well provided for display on a graphics monitor.

The following options are planned as future extensions:

- 4K/2K Spatial processor including Rotation and (H)DTV and SDTV outputs
- 4K/2K Six sector color processor
- 4K/2K Grain reduction
- 65/70mm and 8mm film scanning

2.2 FILMDECK

2.2.1 SLIDING FRONT DOORS

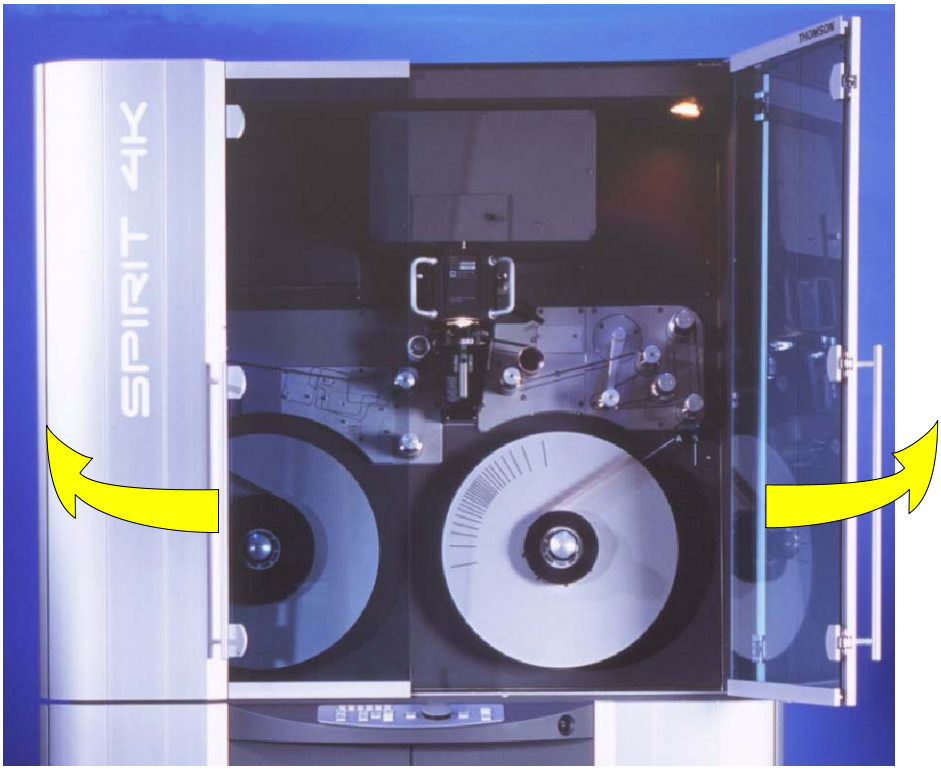


Fig. 201: Spirit 4K film scanner

The two sliding front doors can be opened to both sides.

To prevent injuries please use only the door handles to open and close the sliging doors.

NOTE!
When the film scanner is running, always keep the front doors closed, do not touch the rotating film deck parts. The closed front doors protect against fluttering film ends in the event of a film break. During operation, the filmdeck front doors are secured with an automatic locking mechanism:

- **Front doors open:**
  Film operation up to a fixed speed of maximally 50 frames per second is possible.
- **Front doors closed:**
  All operation modes are possible
- **Front doors locked:**
  At more than 3x the standard speed, closed front doors are locked additionally. The front doors are unlocked as soon as lower shuttle speed is reached again.

2.2.2 FILMDECK OVERVIEW

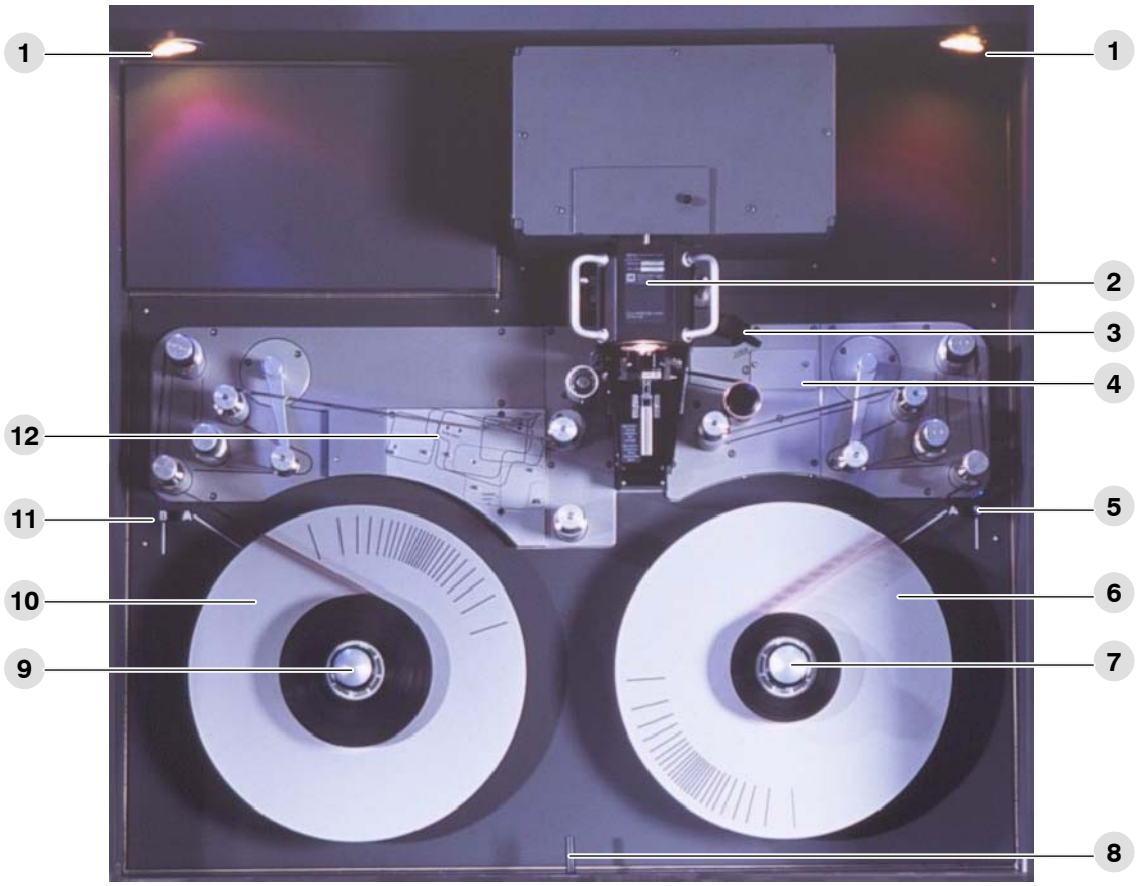


Fig. 202: Filmdeck Overview

1 Film deck illumination lamps. Can be switched on and off as required.
Details see section 2.2.4 below.

2 Lens Gate Assembly (LGA)
Alternatively 35mm LGA, 16mm LGA or 65mm LGA

3 Locking lever for the optical block (LGA).
The optical block is locked by turning the locking lever in cw direction.

4 Mounting position of the Audio Scanning Unit (option)

5 Winding direction switch **A**/**B** (right)
Switch over the winding direction:
WIND **A**: Winding direction in ccw direction.
WIND **B**: Winding direction in cw direction.

6 Winding plate (right)

7 Locking knop (right)

8 Compressed air nozzle

9 Locking knop (left)

10 Winding plate (left)

11 Winding direction switch **A**/**B** (left)

12 Mounting position of the Key Code Reader (option)

2.2.3 LOCAL CONTROL PANEL

Fig. 203: Local Control Panel FH 7500

Local control panel for basic operating functions, e.g. Play (FWD and REV), Stop, Step (FWD and REV), Shuttle, FPN, Framing, Stand by, Focus, Filmdeck illumination and remote delegation.

2.2.3.1 Mains Switch

The mains switch is located on the riht side of the local control panel.

Fig. 204: Mains switch

2.2.3.2 Control Buttons

- **REMOTE**
  Pressing the button delegates the control functions from the Local Control Panel to a Remote Control Panel and vice versa (toggle mode).
  The key is lit when the control is delegated.

- Function Buttons **F1 ... F6**.

  - During start-up, the button lamps **F1 ... F6** shows the start-up status.
  - After start-up is finished button lamp **F2** (and both **FPN** buttons) are blinking, Pressing **F2** restore the previous stored FPN data. The button lamp lit during the loading process.
  - When the FPN correction or FPN reload is finished, button lamp **F1** is blinking. By pressing the button **F1** the previous FPN state will be restored.
  - Switching and dimming the filmdeck lighting with buttons **F4 ... F6**. See section 2.2.4 .
  - **Do not use the F3 button during normal operation with inserted film!**
  - For a special operation “without film” or using a “film loop”, the “Stand by” mode can be enforced by pressing **F3** button. In this case, the blinking button lamp **F3** indicates this “abnormal” operationg mode.
    Pressing the button again switched to “Stand by Off”.

- **Stand by**
  Indicates that the machine is ready for operation. Momentary-contact pushbutton to switch the device in “stand by” mode:
  The winding motors are switched on (film is automatically tightened) and the capstan motor is released for operation. Note that FPN has be carried out before!

- **FPN (2 buttons)**
  Executes the so-called Fixed Pattern Noise and shading correction (shading signal compensation and white balance).
  During FPN the film gate has to be open (no film threaded). In order to avoid operational errors, this function is only carried out when the both FPN buttons are pressed at the same time.

- **Keys FRM ▽ / △**
  Up and down pushbutton to adjust the coarse film framing.
  Each time the key is pressed, the framing is shifted in downward or upward direction by a quarter of the picture height.

- **Shuttle / Focus Wheel**
  Function together with button **Shuttle** for rapidly locating a scene in forward and reverse run.
  Function together with button **Focus** adjust/assist for optical film focusing.

- **Shuttle**
  Visible search mode is switched on.
  If selected: shuttle speed = 0 and audio channel is muted.
  Shuttle mode can be selected from all operational modes.

  The search speed can be set by rotation of the Shuttle Wheel:
  - Rotation to the left = film motion reverse
  - Rotation to the right = film motion forward

  Once selected the speed remains constant.

- **Step** ⏮ / ⏭ (REV / FWD)
  Single-frame selection forward/reverse.
  On pressing the Step forward key, the next film frame relatively to the current position is scanned, immediately after stop the machine is in Stop mode.
  Step frame has broadcast quality.

- **Play** ◁ / ▷ (REV / FWD)
  Film transport in forward or reverse mode. Can be entered from all operating modes. The projection lamp is switched to full lighting power.

- **Stop** □
  Using Stop in Play mode: Quick stop.
  Using Stop in Shuttle mode: Termination of the search function.
  After Stop the the safety shutter is closed automatically.

2.2.4 SWITCHING AND DIMMING THE FILMDECK LIGHTING

- Press **F4** button to switch the filmdeck lighting on/off.
- Press **F4** + **F5** to dimm the lighting in five steps
- Press **F4** + **F6** to turn up the lighting in five steps

2.3 GRAPHICAL CONTROL PANEL GCP1

2.3.1 OPERATING OVERVIEW

2.3.1.1 Display and Dialog Buttons

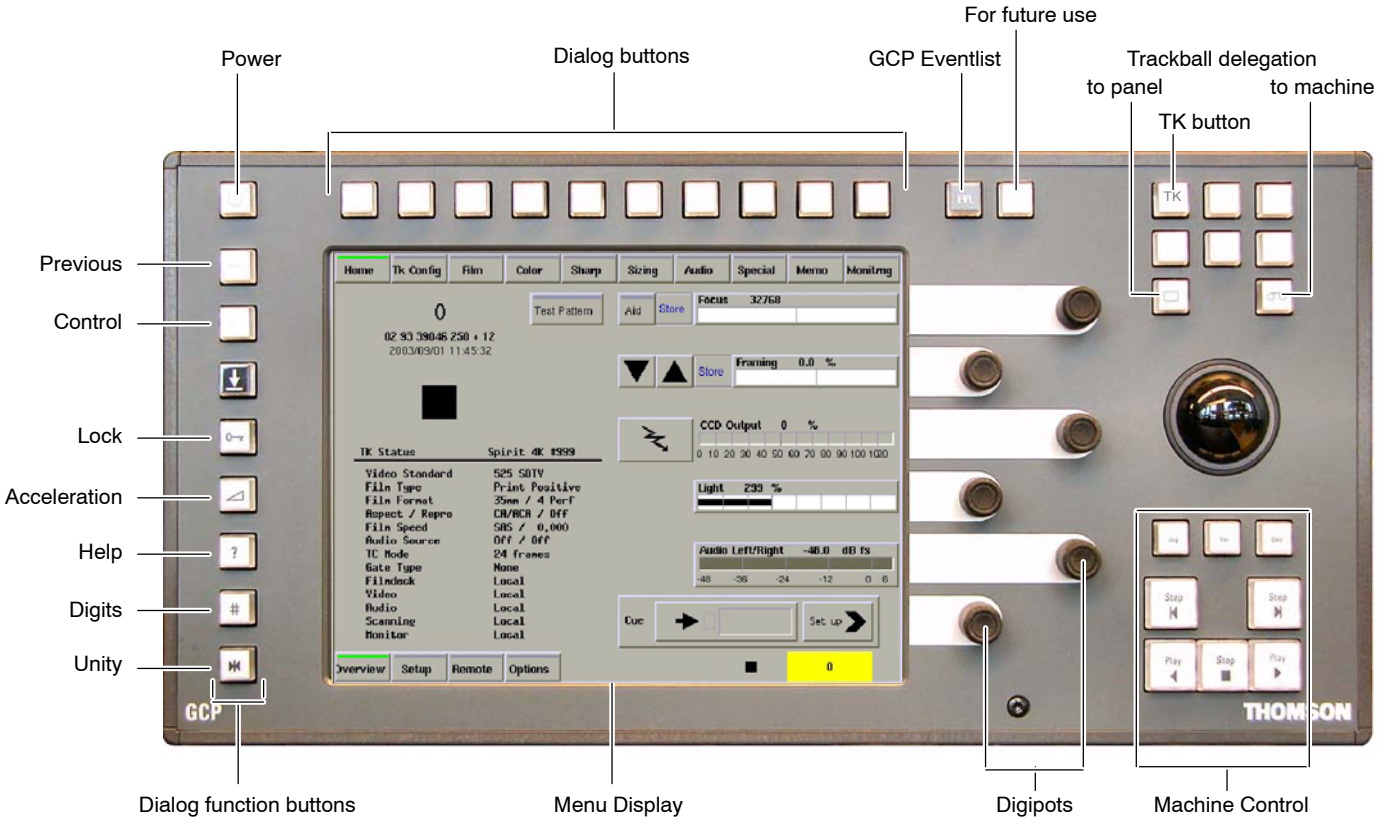


Fig. 1: Graphical Control Panel GCP1

The display is a TFT color display with a resolution of 640 x 480 Pixels and 256 colors. The visible display diagonal is approx. 26 cm (10.4 inches) is surrounded by the following controls:

- Power on / off button
- 10 dialog buttons
- 8 (7) dialog function buttons
- 6 digipots
- Machine control & Trackball delegation

2.3.1.2 Using the Touch Screen

To operate use your finger tips or the Thomson stylus, delivered with the standard accessories set. Do not use pointed, sharp edged or metallic objects as they might damage the surface of the touch screen!

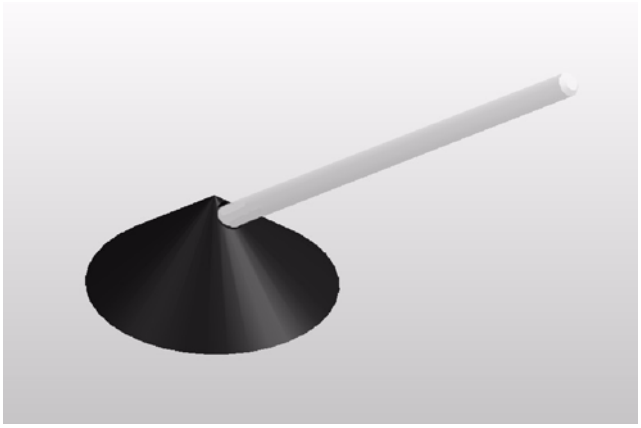


Fig. 2: Thomson stylus with holder

2.3.1.3 Cleaning the Touch Screen

The .007 inch thick polyester layer of the touch screen has a hard coat material on the touch surface which resists scratches and is provided with an antiglare finish.

To clean use normal household cleaner only. By no means use products containing solvents, such as methylene chloride or benzyl alcohol which might damage the surface.

2.3.1.4 Calibrating the Touch Screen

The touch screen of the GCP is calibrated in the factory. Anyway, if it is desired to recalibrate the touch screen, this is the procedure:

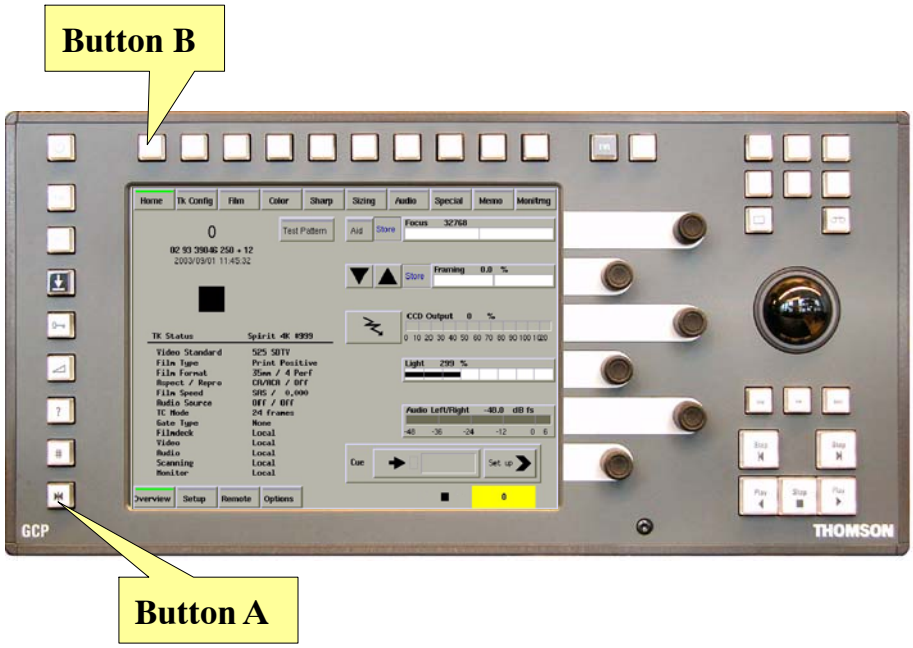


Fig. 3: Graphical Control Panel

To calibrate, press and hold down the **UNITY** button (Button A) and press the first dialog button (Button B). Release both buttons when the touchscreen calibration dialog has opened.

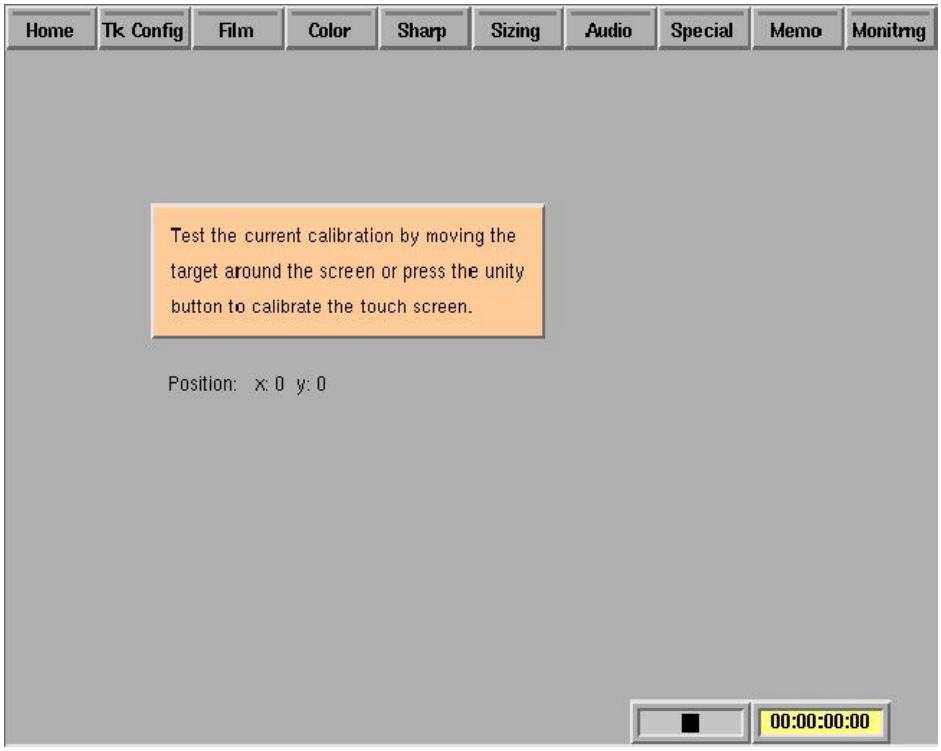


Fig. 4: Touch screen calibration test dialog

You can check the current calibration by touching the screen and viewing the x and y position displayed in the middle of the screen. The screen resolution is 640 x 480, so if you touch the upper left corner, the position should be as near as possible to x:0, y:0 and in the lower right corner x:640, y:480.

To recalibrate the touch screen press the **UNITY** button (Button A) again.

A target shows up in the lower left corner of the display. Touch the target as exact as possible.

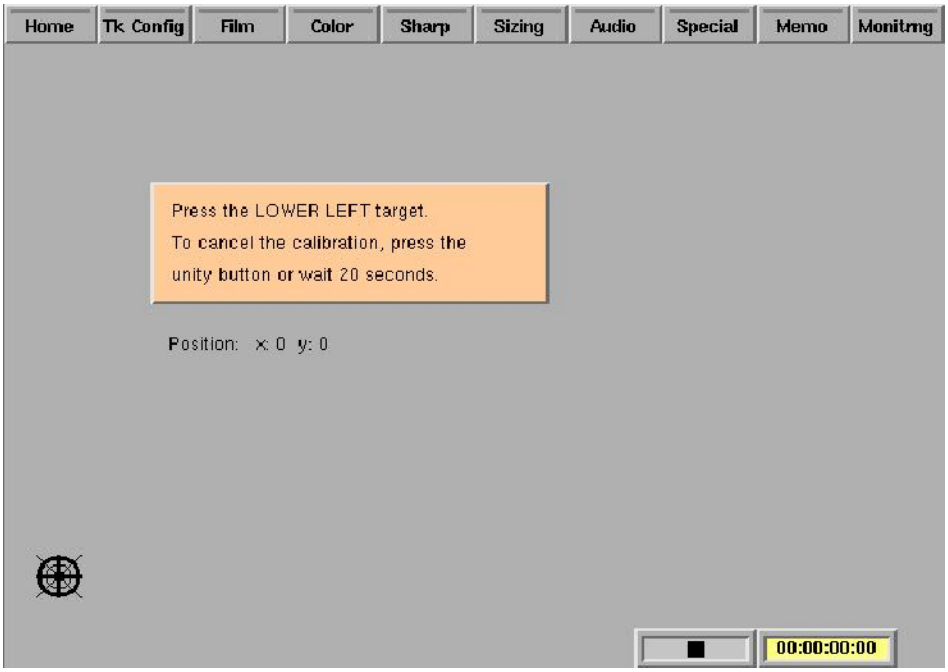


Fig. 5: Touch screen calibration – step 1

Following that, the target moves to the upper right corner of the screen.

Fig. 6: Touch screen calibration – step 2

Touch the target again. A long beep indicates that the calibration procedure was successful.

Press any dialog group selection button to leave the calibration dialog.

2.3.1.5 Dialog Buttons and Keys

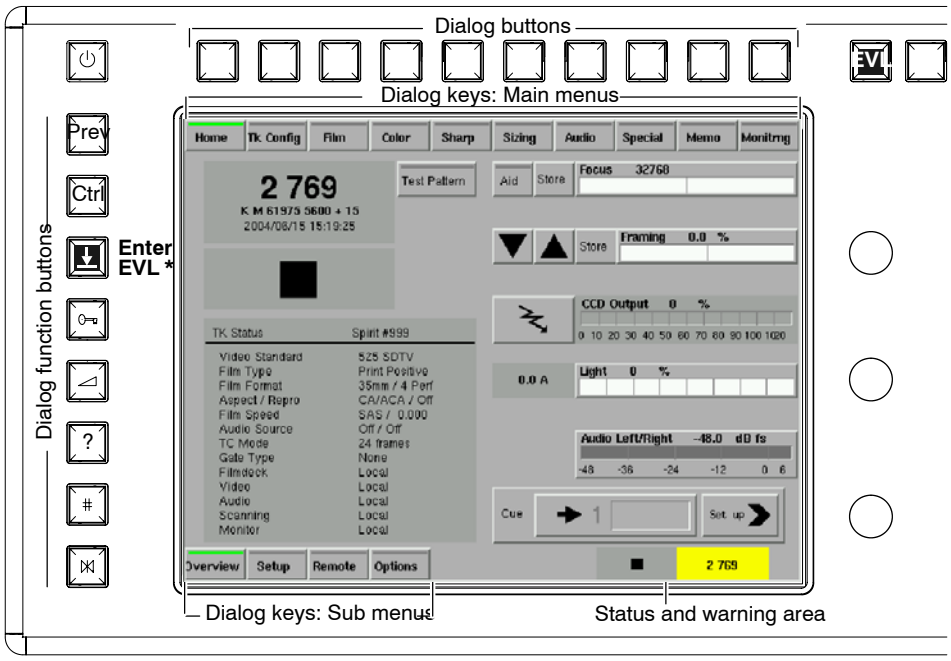


Fig. 7: Example of a GCP menu

Dialog Keys for Main Menus:

On top of the screen there are 10 DIALOG KEYS which can be used for main menu selection. They are displayed alike in each menu. Pressing once the hard key (dialog button) on top has the same effect.
In some menu items the DIALOG KEYS are replaced by a numeric keyline. In this case the keys can be used to type in a value of a certain control.

Dialog Keys for Sub Menus:

On the bottom of the screen there are soft keys as well. They can be used for submenu selection. Each of these keys stands for a submenu which is available under the current main menu.
The names of the sub menus are displayed on the keys. It is also possible to enter a sub menu by pressing the dialog button several times.
In case a numeric keyline is active (in some menu items), the SUB MENU SOFT KEYS are replaced, they can then be used e.g. to enter or cancel a numerical value.

Status and Warning Area:

Always visible (in each dialog) in the lower right corner of the screen there are status displays containing the current transport mode, speed and timecode of the telecine.

The background color of the timecode display is Grey if the telecine is in play mode and the servo is locked, Yellow if the telecine is in play mode, but the servo is not locked, and Red if the telecine is not in stand by mode or no connection is established between the telecine and the GCP

If an error occurs or the telecine sends a warning message, a warning sign is displayed as well in the lower right corner of the screen. Click on the warning sign to

switch over to the Monitoring / Diagnosis menu to read the error message.
If a severe error occures, the warning sign flashes.

Color Coding and Styles within the Menu:

Color / Style	**Function**	**Comment**
Red	Attention	Severe warning
Yellow	Attention	Unusual value, other warning
Green	**On** state, in the case of on/off buttons	
Grey	Menu background	Normal general color
Light grey	Displays	
White background	Active option menus and sliders	
Raised knobs	Option menus, sliders and general controls	
Sunken displays	(Dark grey frame control flat with dark grey frames)	Control cannot be used in this mode of operation.
Grooved frame	(Control flat with grooved frames)	Control locked by user

Dialog Function Buttons:

In general, pressing one of the lower 5 FUNCTION BUTTONS (left to the touch–screen) affects the control operated within the last 5 seconds. In case no control was operated during the last 5 seconds, pressing the button once does not have any effect.
Double clicking one of the 5 FUNCTION BUTTONS affects all controls in the current dialog, e.g. double click the UNITY FUNCTION BUTTON sets all controls of the current menu to unity.
When pressing one of the buttons for 5 seconds, a dialog window opens and the corresponding FUNCTION BUTTON is lit. When pressing this button again, the dialog window disappears and the button is not lit anymore. The same happens if you click OK or Cancel in the dialog window. W Holding down one of the 5 FUNCTION BUTTONS and simultaneously clicking on some control has an effect on this control, e.g. to lock a certain control.
All dialogs windows are automatically closed after a certain amount of time (when no actions take place).

Power Button:

To switch on the GCP, press the POWER BUTTON. Note: The boot up sequence takes about 2 minutes! While booting, the progress is indicated by the 10 buttons lamps which successively get lit. To check the boot messages on the display, hold down the DISPLAY BUTTON.

To see the boot messages permanently, hold down the DISPLAY BUTTON and simultaneously press the ”0” BUTTON.
Press once the POWER BUTTON during operation, to display the LOGIN MENU page. This page serves to add or delete NEW USER and to choose and delete USER PROFILES.

New User:

Click on the USER Key, a drop down menu opens containing all existing users. To add a NEW USER click on <new user>. A two-lined keypad is activated on top of the screen. Type in the NAME and confirm by hitting OK. Now you are requested to enter a PASSWORD. Type it in (Maximum: 8 characters) and confirm by hitting OK. It is also possible to hit OK without having entered a PASSWORD. If a user wants to log in, the password is requested.
The current USER is shown on the key display.

User Profiles:

The settings of the different USER PROFILE keys are stored under the currently active USER.
The sound for KEY CLICK or END OF RANGE can be turned on or off, SCREEN-SAVER and MENU TIMEOUT can be set from one minute to one hour (in steps) or switched off. To change settings click on the keys and make your choice from the drop down menu.
The current setting is shown on the key display.

Display and Button Illumination:

On the right side of this page you find the DISPLAY and the BUTTON illumination sliders.
Find a setting which suits most the surrounding light condition of the GCP. The range is from 0 – 100%. To change slide on the touchscreen or use the corresponding digipots.

Shutdown Button:

Hit the SHUTDOWN BUTTON to switch off the GCP. This is the recommended shutdown procedure!
By pressing the POWER BUTTON for about 5 seconds, the GCP is cut from the power supply. This shuts down the panel improperly and is therefore not recommended!

Previous Button:

This button has two functions:
1. To navigate between menu pages. To switch back to the previously selected menu page, the button has to be pressed once. This can be repeated several times to toggle through a number of previously selected menu pages. To come back to the currently operated menu press the button for two seconds.
2. To toggle between different settings/selections of one control. Some selections require observation on the picture monitor. Using the PREVIOUS BUTTON allows you to toggle through all possible settings without having to look at the GCP display. E.g. Masking Mems, Aspect Formats, Film Types, etc.

Control Button:

The CONTROL BUTTON allows to get or abort control over the telecine.
Press once the CONTROL BUTTON to control all functional groups (Film Deck, Video, Audio, Scanning, Monitor) of the telecine. In this case the CONTROL BUTTON is lit. Press once again to abort control, the button lamp is then switched off.

Enter Eventlist Button:

In order to avoid toggling permanently back and forth from the EVL menu pages assign **Enter** to a hard key. This assignment is done on the EVL Setup menu.

Lock Button:

The LOCK BUTTON allows to lock and unlock controls. It is possible to lock a single control, a menu page, a whole menu or the whole panel. A locked control is grayed out on the display and can't be used until it gets unlocked again; it is thus save from unintentional modifications.
To lock/unlock the control used last, press the lock button once. (Has to be done within 5 seconds after using the control.)
Another way to lock/unlock a single control is to hold down the LOCK BUTTON and simultaneously touch the respective control on the screen.
To lock or unlock the whole page, double click the LOCK BUTTON. To generally lock or unlock press the LOCK BUTTON until a popup window opens containing keys to lock or unlock the whole page, the whole menu and/or the whole panel. Click on the keys to lock/unlock the different units. If the controls are locked the key display reads "Unlock", if the controls are unlocked it reads "Lock". Hit Close to exit the window.

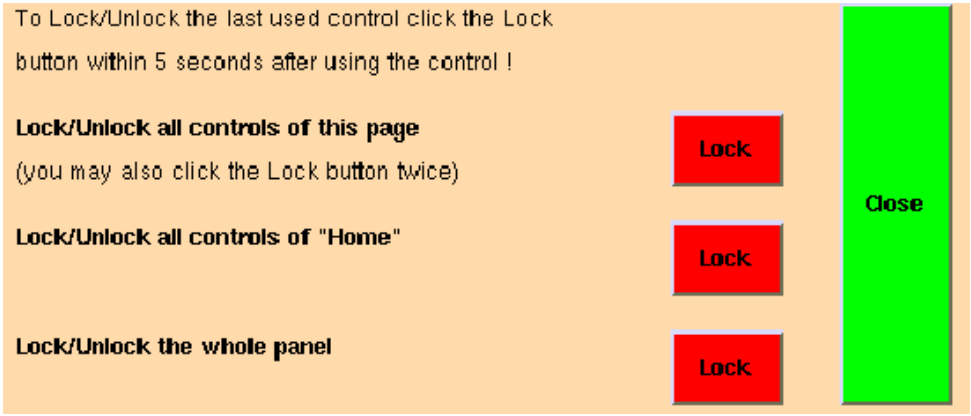

To Lock/Unlock the last used control click the Lock
button within 5 seconds after using the control !
Lock/Unlock all controls of this page
(you may also click the Lock button twice)
Lock
Lock/Unlock all controls of "Home"
Lock
Lock/Unlock the whole panel
Lock
Close

Fig. 8: Lock button pop-up dialog

Acceleration Button:

The Acceleration button serves to adjust the digipot or trackball sensitivity.

To adjust the characteristics of the last used control, press the ACCELERATION BUTTON once or hold down the ACCELERATION BUTTON and simultaneously touch the respective control on the screen.

A dialog window opens offering tools to adjust the sensitivity of the digipots. This is done by altering the AMPLIFICATION and/or PROGRESSIVENESS mode. The setting of each GUI control can be adjusted separately to achieve a differentiated behavior.

The currently modified control is displayed at the bottom of the dialog and can be used to check the altered adjustments. If you are happy with your modification hit OK, if not hit Cancel. Hitting either key closes the dialog window.

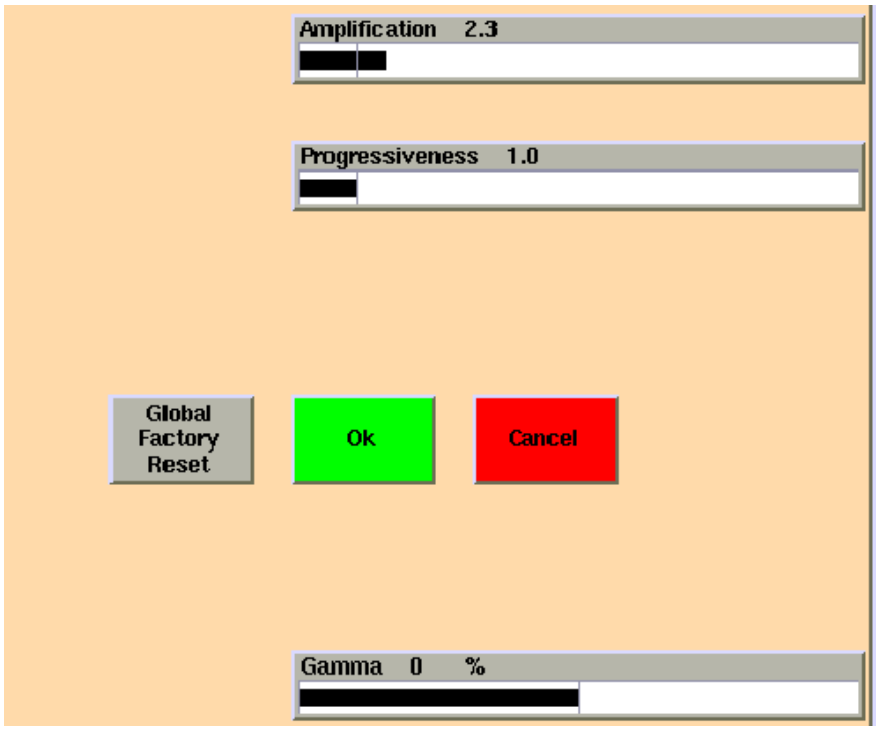


Fig. 9: Acceleration dialog window

- **Amplification**
  The more you turn the digipot or the trackball (of the respective control), the bigger the resulting adjustment.
  With AMPLIFICATION you define the factor, the increments coming from the digipot or trackball are multiplied with. The amplification range is from 0 to 100. That means the lower the factor, the more increments the digipot or trackball has to deliver to achieve the same result.
  That is for fine adjustment. Low amplification values are apt for fine adjustments; high values are apt for coarse adjustments.

- **Progressiveness**
  The faster you turn the digipot or trackball (of the respective control), the bigger the resulting adjustment. The PROGRESSIVENESS range is from 0 to 100. With PROGRESSIVENESS, you control the efficiency of turning speed of the digipot or trackball The lower the progressiveness, the faster you have to turn the control to change a value.
  (For fine adjustment). Higher progressiveness needs less turning speed to achieve the same result. (For coarse adjustment).

- **Ok**
  If you are happy with your recent modification of the control settings hit OK. The new settings are valid from now on (stored) and the dialog window is closed.

- **Cancel**
  Hit CANCEL to abort the recent modifications. The dialog window closes.

- **Global Factory Reset**
  If you want to return to the factory defaults click on the GLOBAL FACTORY RESET key.
  Hit the OK button after the popup confirmation request. This will set the sensitivity of all controls to factory default.
  If you want to recall the factory settings of one single control hold down the UNITY BUTTON and simultaneously touch the AMPLIFICATION and/or PROGRESSIVENES sliders. This will bring back the factory default of this specific control.
  Everything described also applies to the trackball.

Help Button:

The HELP BUTTON serves to display a file containing information related to the currently operated control. Press the HELP BUTTON once to show the help file related to the control operated last.

Another way to show the help file is to hold down the HELP BUTTON and simultaneously touch the respective control on the screen.

To show a help file of a whole menu page, doubleclick the HELP BUTTON. Use the digipots to scroll through the whole file content.

To exit the help file display click press the HELP BUTTON once again.

Digits Button:

The DIGITS BUTTON allows to show, hide and select the type (code values or percent values) of the numerical display of values.
To show/hide the numerical value of the control used last, press the DIGITS BUTTON once. This has to be done within 5 seconds after using the control.

To show/hide/select the numerical value of a single control, hold down the DIGITS BUTTON and simultaneously touch the respective control on the screen.

To show/hide the numerical value of a whole menu page, double click the DIGITS BUTTON.

To generally show/hide numerical values, press the DIGITS BUTTON until a popup window opens containing keys to show/hide the numerical values of the whole page, the whole menu and/or the whole panel. Hit Close to exit the window.

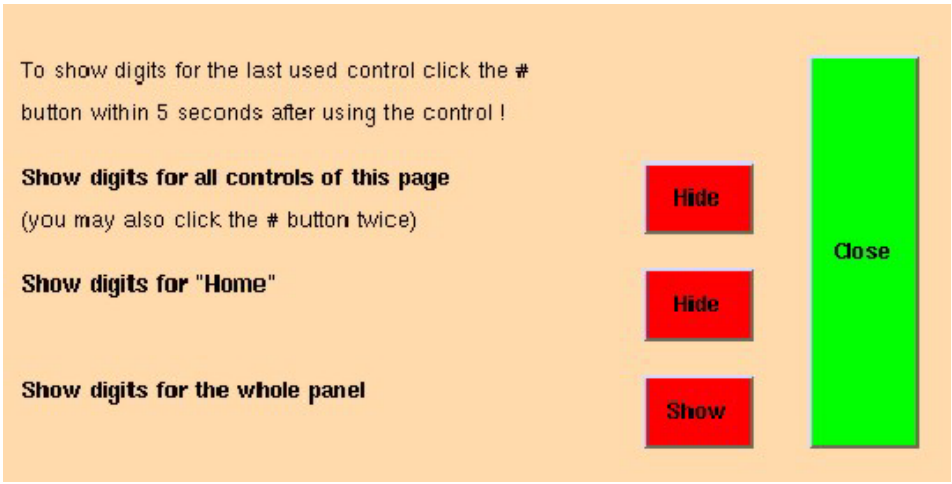

To show digits for the last used control click the #
button within 5 seconds after using the control !
Show digits for all controls of this page
(you may also click the # button twice)
Hide
Show digits for "Home"
Hide
Show digits for the whole panel
Show
Close

Fig. 10: Digit button pop-up dialog

Unity:

The UNITY BUTTON allows to reset controls. To reset the control operated last, press the UNITY BUTTON once. This has to be done within 5 seconds after using the control.
To reset a single control, hold down the UNITY BUTTON and simultaneously touch the respective control on the screen.
To reset the whole page, double click the UNITY BUTTON.
To perform a global reset, press the UNITY BUTTON until a popup window opens containing keys to reset the whole page, the whole menu and/or the whole panel. Hit Close to exit the window.

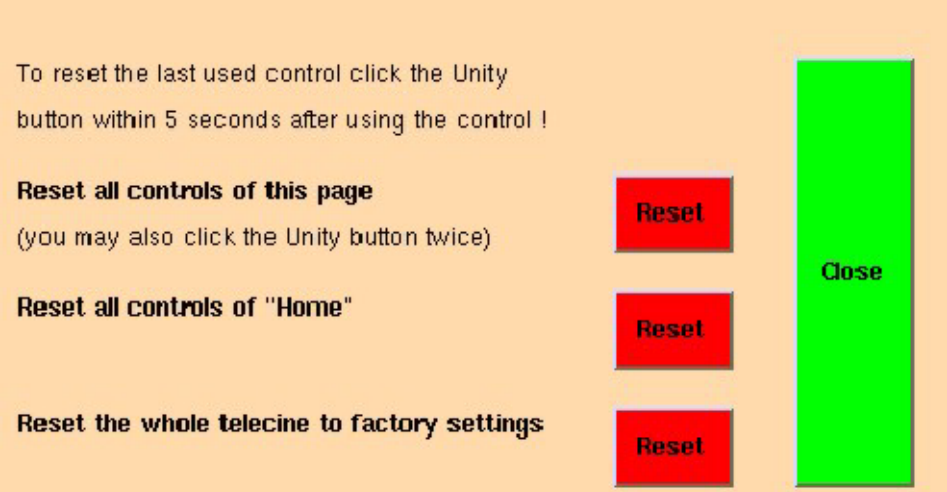

To reset the last used control click the Unity
button within 5 seconds after using the control !
Reset all controls of this page
(you may also click the Unity button twice)
Reset
Reset all controls of "Home"
Reset
Reset the whole telecine to factory settings
Reset
Close

Fig. 11: Unity button pop-up dialog

Digipots:

On the right side of the touchscreen there are 6 digipots. They can be used to alter values or to scroll in status windows. The digipots are assigned to the controls of the currently selected menu.
Dialing a digipot has the same effect as sliding the control on the touch screen.

2.3.2 MACHINE CONTROL SECTION

The Machine Control Section is located in the lower right corner of the GCP. All buttons of this section (including the trackball – if delegated) perform transport functions of the film scanner.

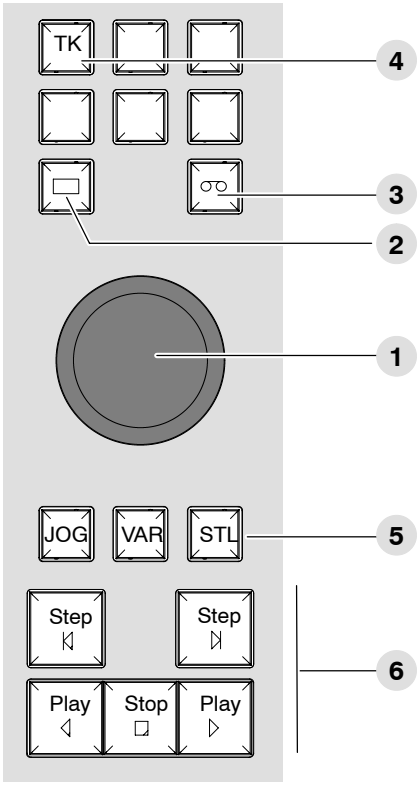


Fig. 12: Machine control section

1 Trackball

2 Display button for trackball delegation to GUI

3 Machine button for trackball delegation to machine control

4 Machine selection (TK)

5 Buttons for machine mode selection (Jog, Var, Shuttle)

6 Buttons for machine control
(play, reverse play, step forward/backward, stop)

Undeclared buttons are not in use!

- **TK Button**
  To control the film scanner press the TK BUTTON (Button gets lit). All transport controls are now delegated to the DataCine.

- **Display Button**
  Below the trackball on the left you find the DISPLAY BUTTON. Pressing this button delegates the trackball to the GUI (graphical user interface).

- **Machine Deck Button**
  Below the trackball on the right you find the MACHINE DECK BUTTON. Pressing this button delegates the trackball to the machine (TK) for shuttle, jog or variable speed control.

- **Trackball**
  The trackball can be used for various functions. Delegation of the trackball is done as follows:
  Pressing the DISPLAY BUTTON delegates the trackball to the next control in the current dialog which can receive trackball input (only possible if there is any control). Moving the trackball has the same effect as sliding the corresponding control on the touch–screen.
  Pressing the MACHINE DECK BUTTON delegates the trackball to the selected machine (TK). In this mode the trackball can be used as a SHUTTLE/JOG/VARI speed control.

- **Jog, Var, Shuttle Buttons**
  3 buttons for the transport mode selection (JOG, VAR and SHUTTLE) are below the trackball. With MACHINE DECK enabled the trackball controls the telecine in the selected mode.

- **Step Forward, Step Backward, Play Reverse, Stop, Play Forward**
  The hard keys for film deck control of the telecine are located below the SHUTTLE/JOG/VARI speed buttons (Step forward, Step backward, Play, Play reverse and Stop).

2.3.3 SOFTWARE INSTALLATION

NOTE!
Software installation and all service works must be carried out by qualified service personnel only!

2.3.3.1 Software Update with “SDCMAINT”

To load a new software version into the GCP the Diagnostic Kit **SDCMAINT**, FH 1660, order no. 0 128 166 000 is required.
Use the included customer’s manual “SDC MAINT” (Diagnosis & Maintenance Tool) Documentation no. FU 0058 , order no. 0 126 625 800.

2.3.3.2 Software Update with “FTP” (File Transfer Protocol)

1. Determine the IP address of the GCP:
   On the GCP press and hold down the #-key and then press the dialog button above the dialog key “Home”;
   Write down the displayed IP address of the GCP, e.g. **192.168.11.102.**
2. Set the IP address of your computer (notebook) to be in the same Class C-network as the GCP (e.g. **192.168.11.1**).

   NOTE!
   Do not use the same IP address for your computer and the GCP!

3. Connect your computer to the telecine network and reboot it.
4. Open a MS DOS command shell and change to the directory where the new GCP software **gcp.tgz** is stored.
5. Start the FTP application:

   ftp <ip-adresse gcp> <enter> (e.g. **ftp 192.168.11.102 <enter>**)

6. Input the user ID and the password for FTP login:

   user id: **gcpftp <enter>**
   password: **gcpftp <enter>**

7. Set the file transmission mode to binary: **bin <enter>**
8. Transfer the file **gcp.tgz** to the GCP: **put gcp.tgz <enter>**
9. Close the FTP application: **bye <enter>**
10. Close the MS DOS command shell.

The GCP now automatically finishes the software installation and restarts the application.

2.3.4 SAVING CONFIGURATIONS

All panel setups are restored after a software installation.
The feature “saving configurations” is not yet implemented.

2.3.5 REMOTE OPERATION WITH SEVERAL REMOTE PANELS

If a film scanner has to be controlled from several remote panels (FCP and GCP), consider the following:

In order to avoid problems with parallel operation, the default setting of the GCP should always be REMOTE 2. When changing the remote address of the GCP, the film scanner has subsequently to be restarted.

2.4 OPERATIONAL PREPARATIONS

The sections of the chapter ”Operational Preparations” have a defined order. Preceding sections are mostly precondition for the succeeding sections (such as ”Perform FPN correction” **before** ”Thread the film” etc.) and should therefore be considered when setting into operation.

2.4.1 HARDWARE CONDITIONS

- **GCP Installation**
  The Graphical Control Panel has to be connected to the Spirit 4K / 2K .
- **Input & Output**
  A detailed overview on the available inputs and outputs and their applications is given in the manual ”Planning and Installation”.
- **Timecode**
  Depending on the application, the time code signal has to be passed on to the other units.
- **Keycode Reader**
  The mounting support combined with a keycode reader head serves to generate the film keycode and to insert it to the DPX data output.
- **Monitoring**
  If required, connect a video monitor for checking, and monitor both audio channels via the audio monitor outputs.
- **Option GSN Phantom Transfer Engine TE 2111**
  The option Data Output - as part of the Transfer Engine option - is required to provide high speed film data - DPX or TIFF format - for recording on computer workstations or Specter Virtual DataCine VDC2000.
  A GSN serial interface - also part of the option Phantom Transfer Engine TE 2111- provides the high speed data transmission to a workstation / Specter via fibre optic cables and GSN Switch.

- **Gateblast**
  Connecting to an external gateblast air compressor is essential!

2.5 POWER-UP

- The film scanner is powered up with the mains switch "**Power**" at the front of the local control panel of the machine (see Fig. 204:).
- To switch on the Graphical Control Panel GCP1 press the power button.
- After power up it takes about 3 minutes before the machine is ready.
  After 90 minutes warming-up time, all characteristics are stabilized.
- The ready status will be indicated by the flashing FPN buttons on the local control panel.
- There are two choices for FPN, reloading the dataset from the last FPN process by pressing the F2 button on the LCP (Local Control Panel) or pressing both FPN buttons to initiate a new FPN process.
  Doing the F2 version the FPN lights will flash simultaneously during the transfer of the old dataset. The transfer will take about 45 seconds.
  Doing a new FPN by pressing the two FPN buttons will take about 25 minutes (Spirit 4K) or 13 minutes (Spirit 2K) to terminate.
- After the Framing buttons stop flashing the machine is ready to operate.

Note:
To avoid EMC (electromagnetic compatibility) problems keep the rear doors always closed during operation!

2.6 BASIC ADJUSTMENTS OF THE FILM SCANNER

2.6.1 CONFIGURATION AND DELEGATION OF THE CONTROL PANEL

Configuration of the graphical control panel is mostly performed only once.

After "power on" the display of the graphical control panel shows the power-up test, and subsequently the **"Home"** menu.

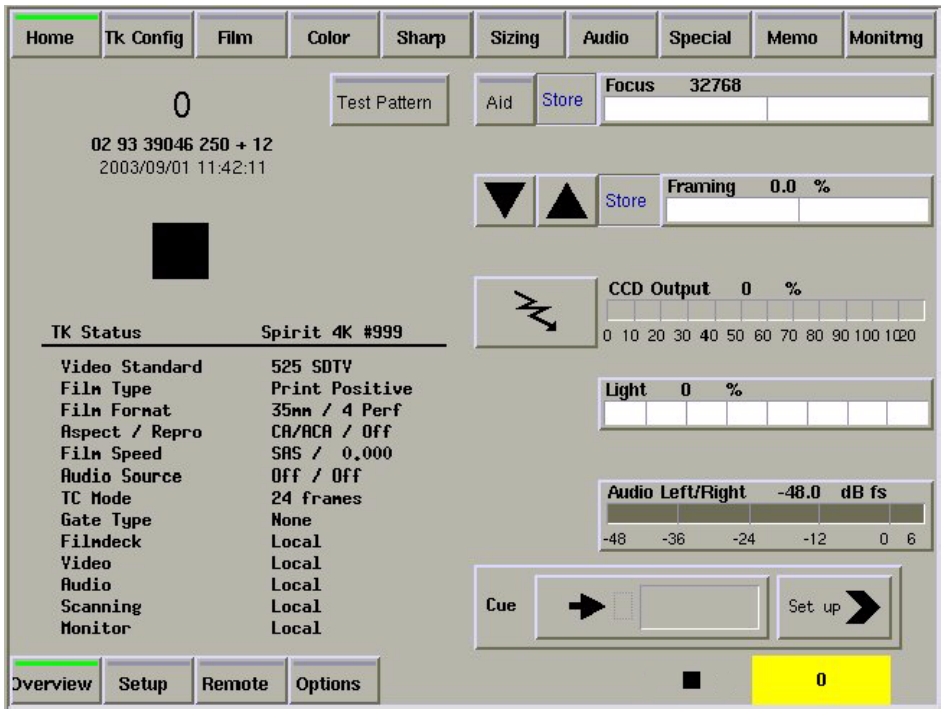


Fig. 305: GCPHome Menu

Press once the **Ctrl** (left button row) to get control over the Spirit 4K or Spirt 2K Film Scanner.

2.6.2 SELECT DATA OUTPUT MODE

If the current data output mode does not correspond to your requirements, change the settings.

2.6.3 CHANGE OPTICAL BLOCK

Changing the optical block (Leans Gate Assy, LGA) allows to scan different film formats. The following LGAs are available:

- 16mm Lens Gate Assy 4K S16 LGA
- 35mm Full Aperture Lens Gate Assy 4K FA35 LGA
- 65mm Lens Gate Assy (in preparation) 4K 65 LGA

How to change the optical block:

1. Remove the threaded film from the optical block, if necessary.
2. Unlock the optical block. For this purpose, move the locking lever on the right of the optical block in upwards ccw direction.
3. Seize the optical block at the two handles, pull it out on its guide rails and remove it.

   ATTENTION!
   When pulling out the optical block, keep a firm hold on it (approx. 8 kg)!

   As soon as the optical block leaves the guide rails, it might be possible that it slides downwards.
4. Set the new optical block on the guide rails and slide it slowly towards the film deck plate until it fits.
5. Lock again the lever beside the optical block (position LOCK).
6. Open the film gate locking lever and close it again, to ensure, that the film gate is not tilt.
7. Perform FPN correction (see section 2.8.3).

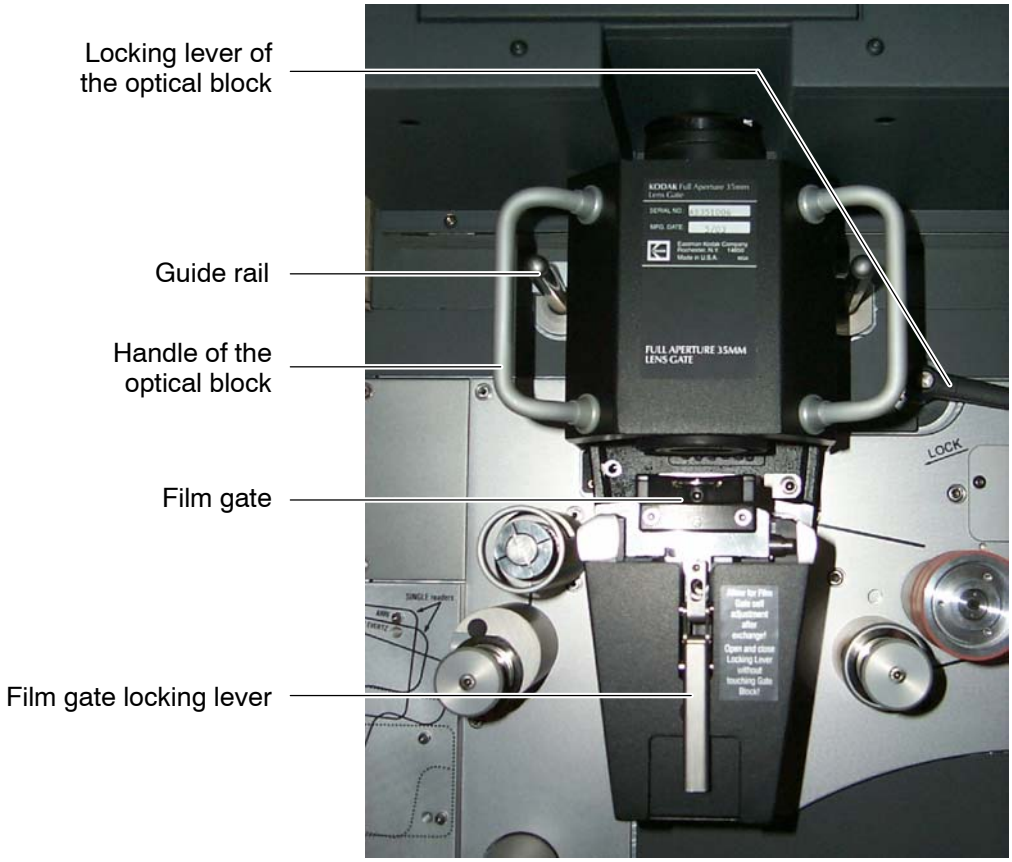


Fig. 306: Optical Block and Film Gate of the Film Scanner

2.6.4 CHANGE THE FILM GATE

The following film gates are available:

- 16mm Film Gate 4K 16 GB
- Super 16mm Film Gate 4K S16 GB
- 35mm ACA Film Gate 4K 35 GB
- 35mm Full Aperture Film Gate 4K FA35 GB
- 70mm Film Gate (in preparation) 4K 70 GB
- Super 8mm Film Gate (in preparation) 4K S8 GB

Super optical blocks need an additional film gate (option) when operating standard films.

1. Open the film gate locking. For that reason hold the film gate locking lever at the lower end and pull it up.

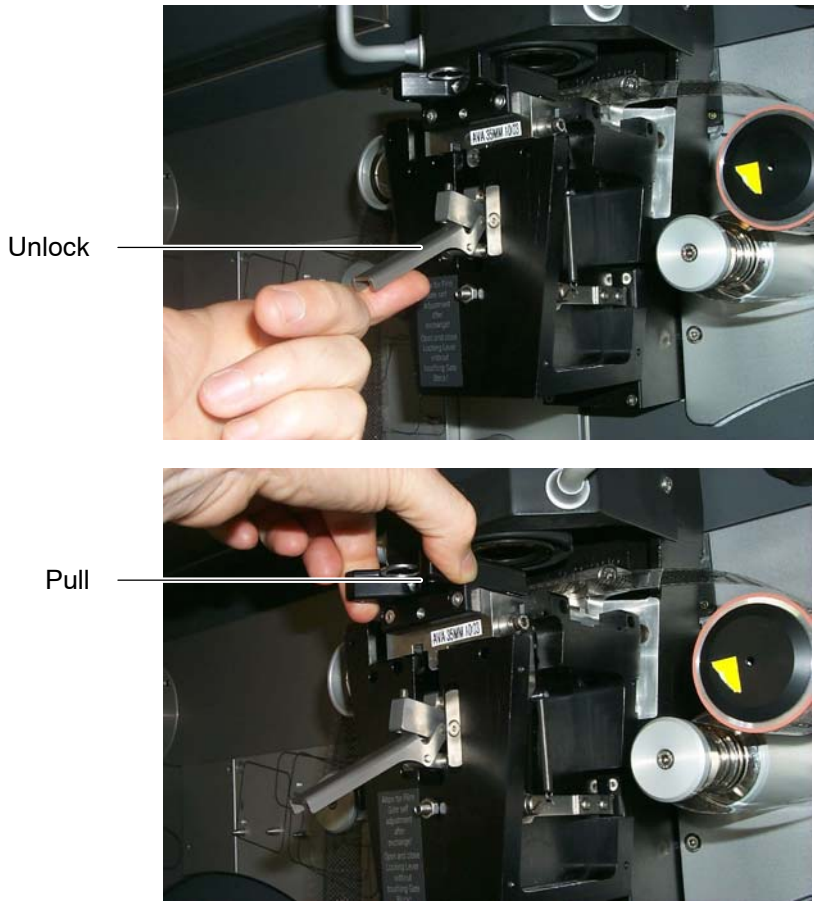


Fig. 307: Remove Film Gate

2. Remove the built-in film gate.
3. Insert and lock the new film gate.
4. Perform FPN correction (see section 2.8.3).

NOTE!
Film Gate self-adjustment after exchange:
Open the locking lever and close it again without touching the Film Gate.

2.7 USING EFFECT FILTERS

2.7.1 GENERAL

Precautions!

- **Insert a filter drawer into the filter drawer slot with filter facing up and the filter side heading as shown in the figure below.**
- **Take care of not fastened filters or hold downs. These can drop into the AIS or LGA and may cause damage to the system.**
- **Do not insert any foreign object into the filter drawer slot. This could result in malfunction and damage to the unit.**
- **To ensure the correct position of the filter and electromagnetic compatibility, the filter door must closed during operation.**
- **Filter drawer can not be installed if the focus slide is in the range of 0 up to 15,000. Set focus to the value >15,000.**

2.7.2 EFFECT FILTER SET

The Effect Filter up to 6mm can be used.

2.7.3 OPEN FILTER DOOR

The filter door is equipped with a self-locking mechanism. By pushing briefly on the left side the door opens.

Fig. 308:

2.7.4 INSERT THE FILTER DRAWER

- Select menu **Home - Focus**
- Adjust Focus to the value >15,000.
  Filter drawer **cannot** be inserted if the focus slide is in the range of 0 up to 15,000.
- Insert a filter drawer into the filter drawer slot with filter facing up.

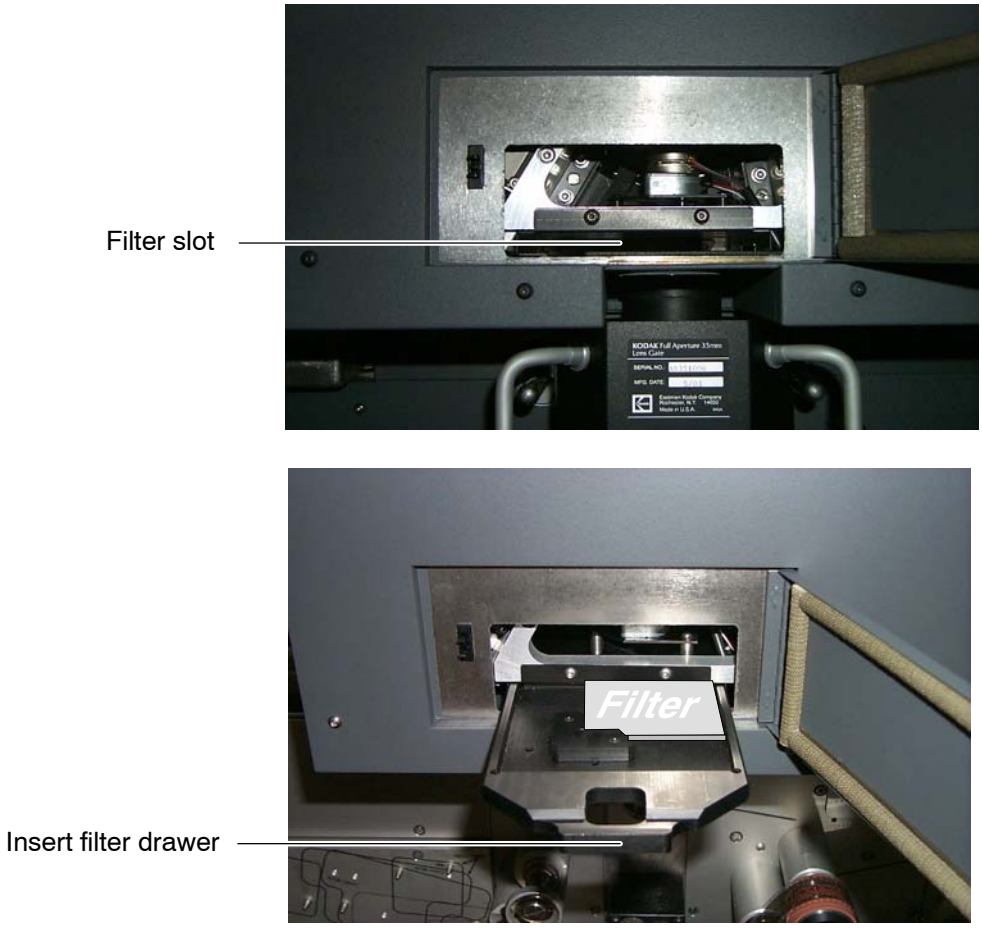


Fig. 309:

ATTENTION!
Never insert the filter with the filter facing down!

The usage of light effect filters can cause de-focussing of the system. It is recommended to adjust the focus of the AIS when an effect filter is being installed or changed.

2.8 FILM DECK CONFIGURATION

Set filmdeck settings in the main menu **“TK Config”**

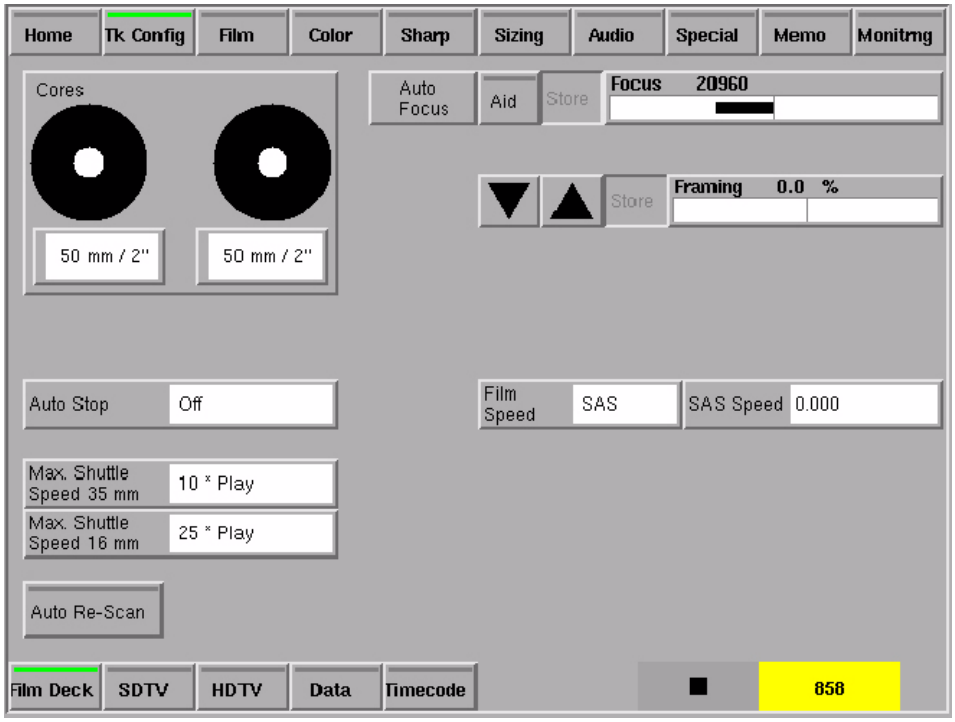


Fig. 310: Menu TK Config (Spirit 2K)

In order to improve film deck operation adjust the following settings:

- Core diameter
- Auto Stop
- Max Shuttle Speed 35mm
- Max Shuttle Speed 16mm
- CCD Resolution 2K or 4K (only Spirit 4K)

2.8.1 SETUP FILM

Open the main menu **"Film"** and adapt the film scanner to the film to be played. Use the button **Film Type** and choose the respective film type**.**

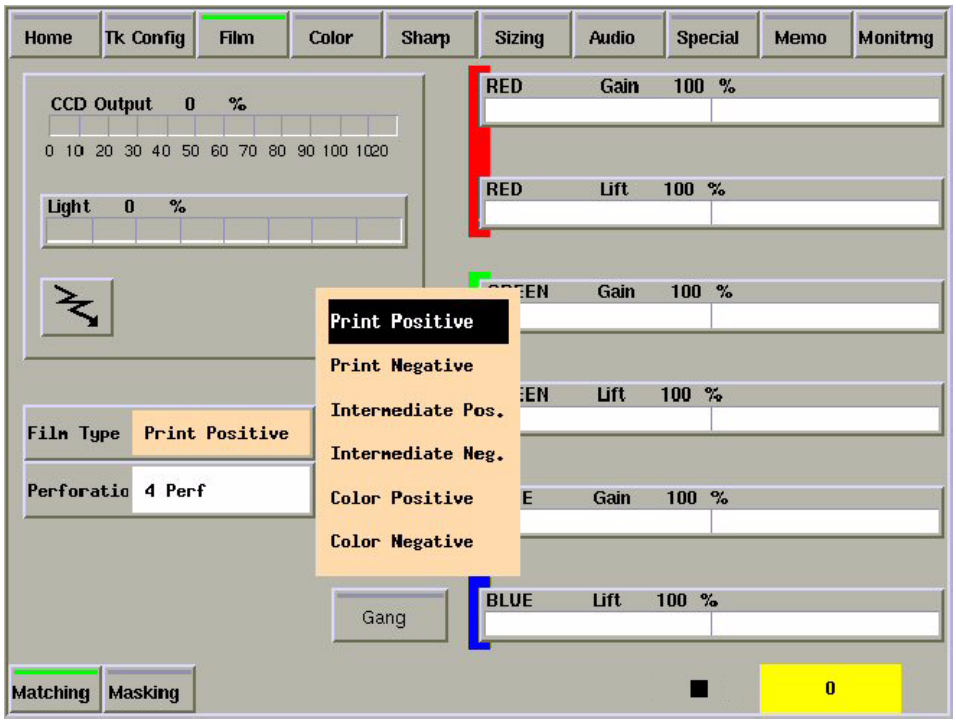


Fig. 311: Film menu

2.8.2 SELECT SPEED

Open then main menu **"TK Config"** and select or adjust a fixed (or a variable) film speed for the film scanner.
Selection of the film speeds and explanations, see section 3.3.

2.8.3 PERFORM FPN CORRECTION

Performing a FPN (Fixed Pattern Noise = Noise signal in the white signal) correction effects an automatic noise signal compensation in the white as well as an automatic white balance adjustment.

- There exists two FPN modes: Reloading the dataset from the last FPN process by pressing the **F2** button on the Local Control Panel or pressing both **FPN** buttons to initiate a new FPN process.
- Performing the **F2** version the FPN lights will flash simultaneously during the transfer of the old dataset. This process takes about 45 seconds.
- A new FPN initialized by pressing the two **FPN** buttons will take about 25 minutes to terminate. See description below.
- After the **FRM** (Framing) buttons stop flashing the machine is ready to operate.

CAUTION!
Don't start a FPN process if film material is in the gate.
Risk to damage the film!

2.8.3.1 FPN Conditions

1. Perform FPN the first time after a "warm up" of about 90 minutes.
2. Never perform FPN with a film threaded on the machine!
   Result useless and danger of thermal film damages!
3. Repeat FPN, if the environment temperature changes by more than ±5°C.
4. Repeat FPN to compensate illumination level losses, if the environment temperature changes by more than ±2°C.
5. The FPN process can any time be initiated and successfully completed, if the scanner is in STANDBY OFF mode.

2.8.3.2 Performing the FPN Correction

Press **both** FPN buttons **together** . In "Stand by" OFF press **F1** at the local control panel. During the automatic FPN correction (duration at Spirit 4K approx. 25 min., Spirit 2K approx. 13 min.) both FPN buttons are lit.

Hints:

If both FPN buttons are blinking, a FPN correction is required or a reload of the last FPN correction file.

Buttons will blink:

1. ***After switching on the film scanner***
2. ***After changing the optical block***
3. ***After changing the film gate***

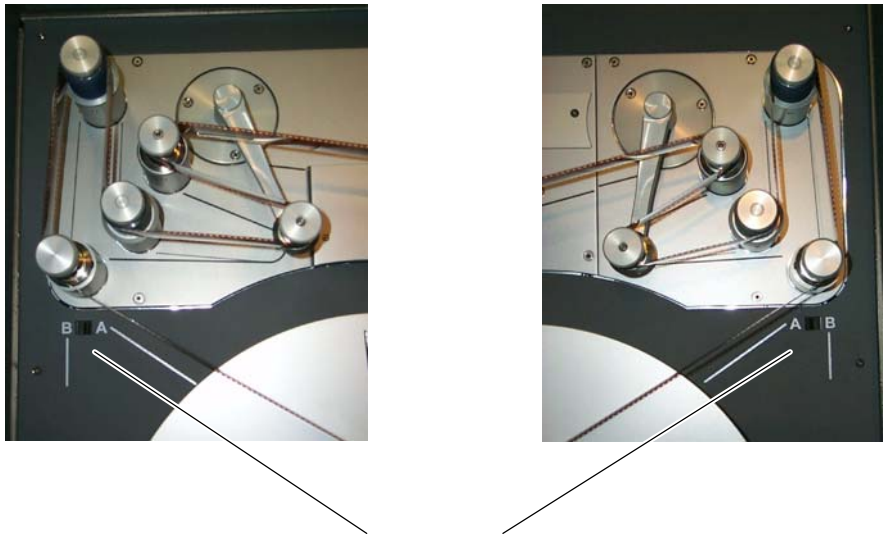
2.9 THREAD THE FILM

Thread the film according to the film threading path printed on the film deck. Before the film can be threaded, the following preparations have to be made.

2.9.1 DEFINE WINDING DIRECTION

The both switches **A**/**B** on the film deck are to be set in **Position A** (= PLAY position) for normal film operation. During operation both film reels wind anti-clockwise.

Position B is used only for rewinding a film wound side-inverted.



Normal operation
Both switches in position A

Fig. 312: Film threading path

CAUTION!
Wrong A/B wind selction could cause film damaging. Do not initiate any film-deck command if a film is threaded in and a A/B wind selection is wrong!

2.9.2 USING FIXED WINDING PLATES

Two fixed winding plates can be mounted on the Spirit 4K / 2K Film Scanner. To adapt any filmtypes to the winding plates use the inlays for bobbins or the inlays for reels as well as the two locking devices. The inlays for 16/35mm films are delivered with the film scanner as ordered or can be ordered separately.

- Reel Drive Set (ANSI specs) with spindels of 8mm diameter (US)
  FH 0708 Order No. 0 126 692 800
- Reel Drive Set (DIN specs) with spindels of 9mm diameter (EU)
  FH 0709 Order No. 0 126 692 900

The inlays for S8mm films are optional und willl be delivered with the 8mm Option Package (in preparation).

2.9.3 MOUNT FILM ROLLS

1. Remove the complete locking device from the reel spindle.
   In addition, pull the release ring towards the release button.

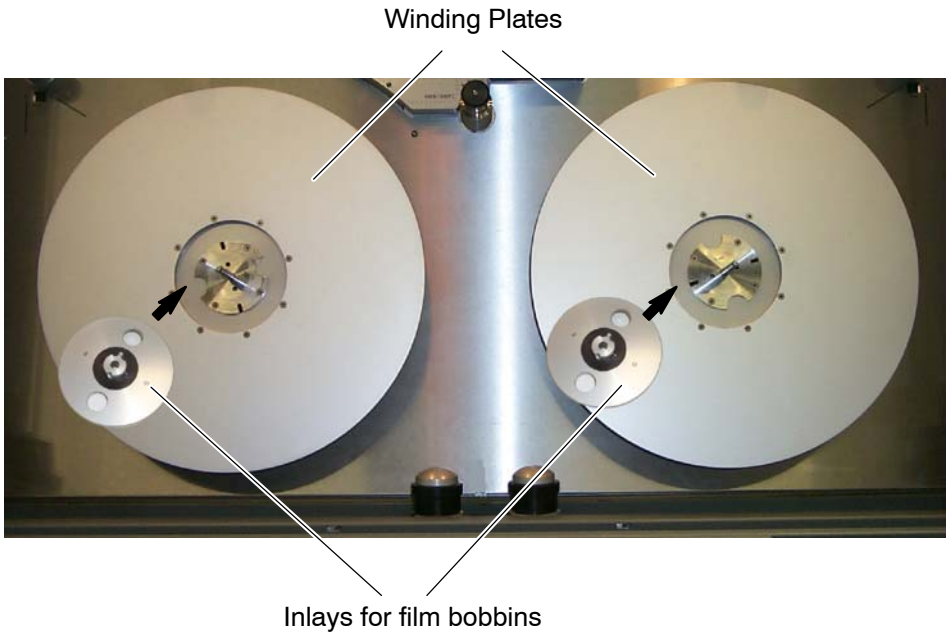


Fig. 313: Fixed winding-sheets with bobbin inlays

2. If the film is on a bobbin, the inlays for bobbins have to be mounted on both fixed winding plates.

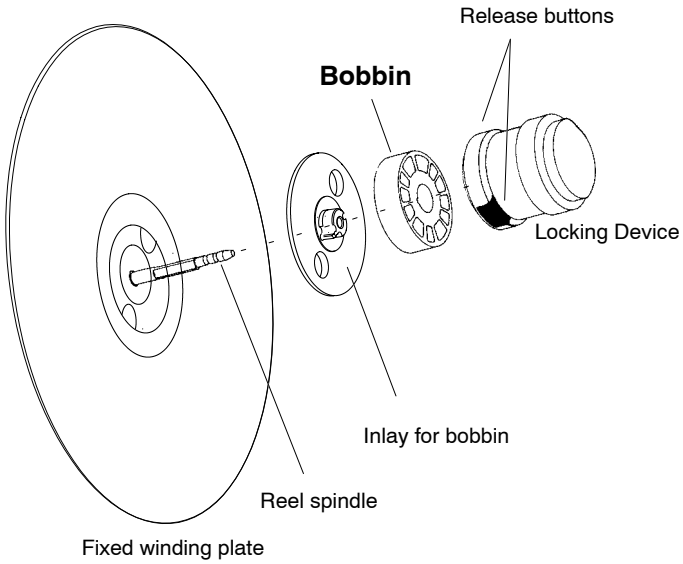


Fig. 314: Mounting film rolls with bobbin

3. Plug in the film bobbin onto the carrier of the inlay.
4. Slide the locking device onto the reel spindle until it locks in with an audible click.

ATTENTION!
When operating with bobbins, the inner shaft of the locking device has to protrude, otherwise press the locking button and the shaft will jump out.

2.9.4 MOUNT FILM REELS

If the film to be played is a film reel, the full film reel has to be mounted on the left-sided reel spindle and the empty film reel on the right-sided one.

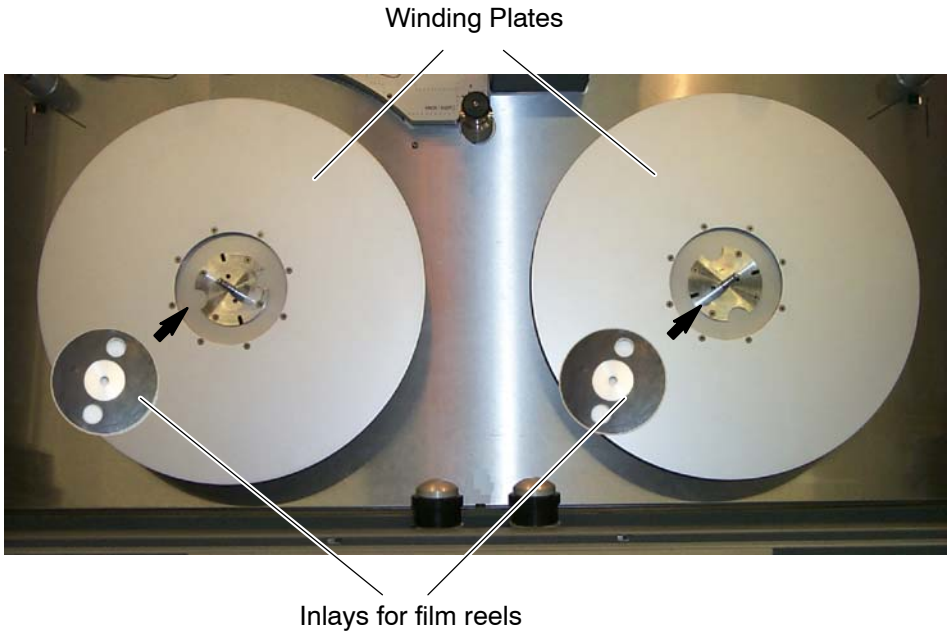


Fig. 315: Fixed winding plates with bobbin inlays

1. Remove the complete locking device from the respective reel spindle. For this purpose, pull the release ring towards the release button.

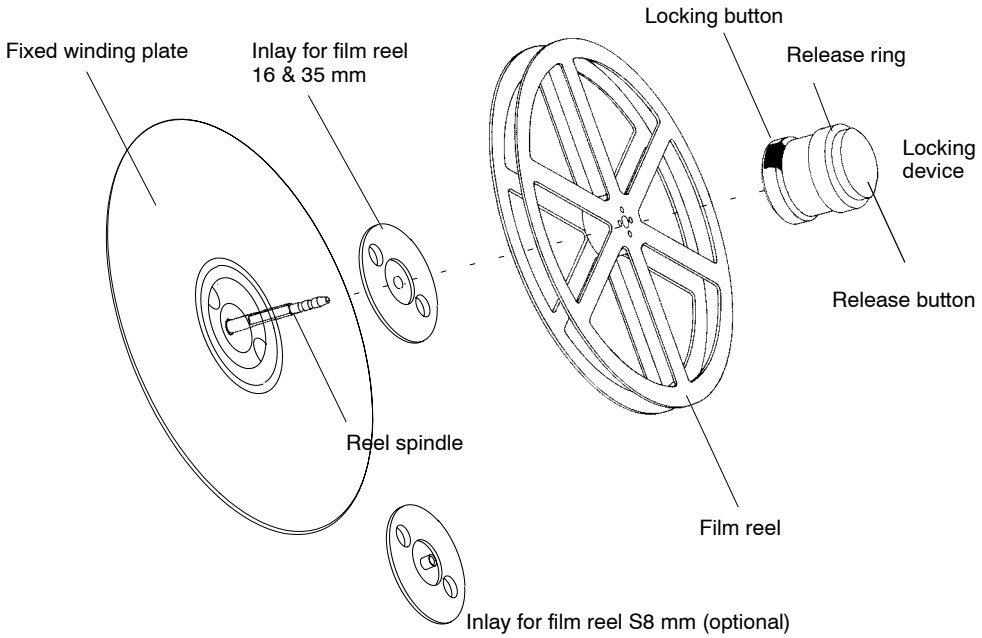


Fig. 316: Mounting the film reels

2. Mount the reel inlay to the fixed winding plate (on each side)
3. Slide the film reel on the reel spindle.
4. Plug in the film reel onto the carrier of the reel spindle.
5. Slide the locking device on the reel spindle until it locks in with an audible click.

ATTENTION!
When operating with film reels, the inner shaft of the locking device has to be sunk, otherwise press the locking button and slide the inner shaft backwards.

2.9.5 THREAD FILM CORRECTLY

FILM	THREAD DIRECTION
16mm Film	Put perforation to the film deck plate
35mm Film	Put audio track to the film deck plate

2.9.5.1 Film Roll with Bobbin Operation

Slide the full film roll, as shown below, onto the left winding plate and lead the film on film path "**A**" (printed on the film deck plate) to the right winding plate.

Insert the film leader into the slot of the winding body and give the winding plate a few turns counterclockwise.

2.9.5.2 Film Reel Operation

Slide the full film reel onto the left reel spindle and lead the film on film path "**A**" to the right (empty) film reel.

Insert the film leader into the slot of the film reel and give the reel a few turns counterclockwise.

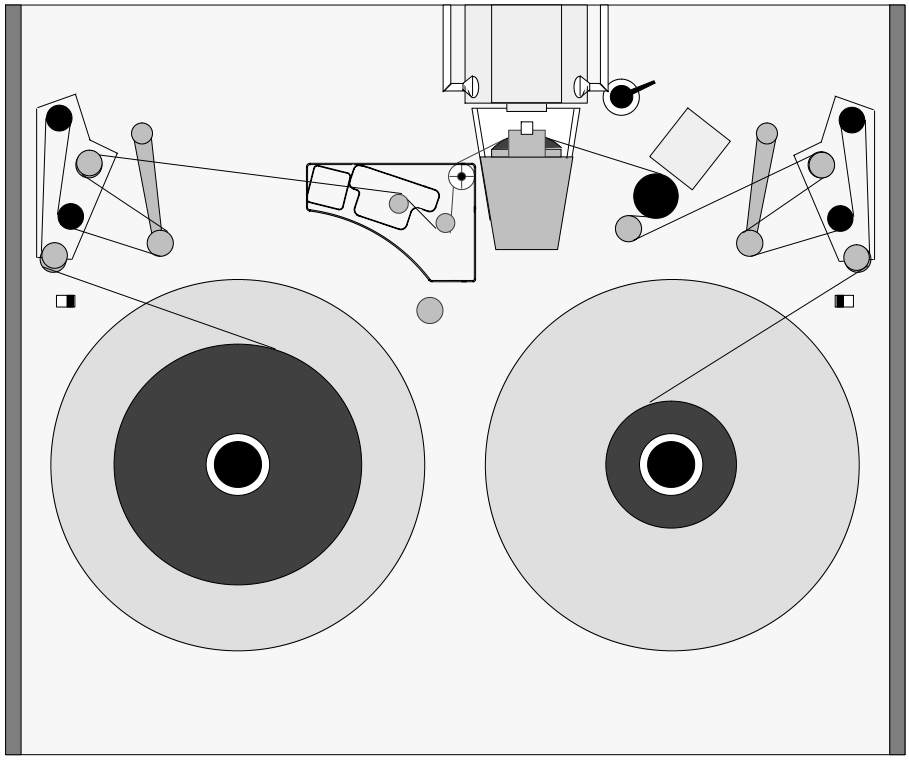


Fig. 317: Film threading path

NOTE!
When threading the film into the film guiding edges of the film gate make sure that the film properly fits to the edges and that no emulsion deposits occur at the film guiding edges (for cleaning see section 4.).

Pulling lever briefly to make shure that the film is guided properly by the lateral rollers.

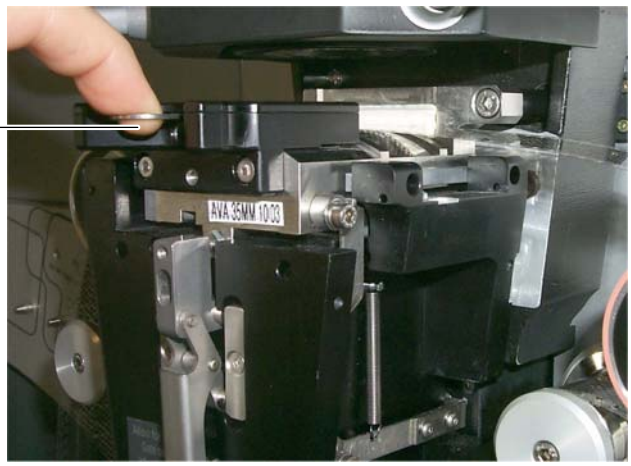


Fig. 318: Film gate guiding

2.9.5.3 Switch to Standby

Subsequently press button “**Stand by**” on the Local Control Panel of the film scanner (film is tightened).

2.10 ADJUST FRAMING

2.10.1 USING LOCAL CONTROL PANEL

To achieve a correct vertical picture position for 35mm films press **Framing** button on the Local Control Panel several times. This effects a coarse framing correction. The vertical picture position is modified by a quarter of the frame high (1 perforation hole) in up or bar downward directioneach time the button is pressed.

2.10.2 USING REMOTE CONTROL PANEL GCP1

Select the Home menu.

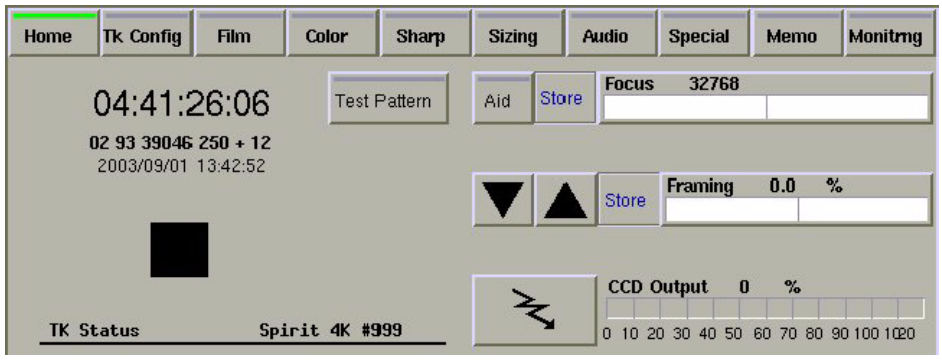


Fig. 319: Home menu with "Framing Adjust"

- Shift frame bar of 35mm film by pressing the framing coarse buttons (arrows up and down) several times until the frame bar disappears under the upper or lower picture border. The framing fine sliders allow neat vertical positioning for all film formats.
- **For factory and service use only:**
  Hitting the **Store** button opens a dialog window. With **OK**, your new setting will be stored and recalled next time when **Unity** is pressed. The default focus setting is important as this value is used during FPN and affects the quality of the FPN.

NOTE!
Be sure to adjust the coarse framing prior to set the timecode frame counter. Shifting the frame bar by 1 frame (i.e. for times framing coarse) will also shift the frame/time code assignment. When placing the film on the sprocket wheel, take care to lace the frame bar on the cross line of the sprocket wheel. Thus, the frame bar will not be visible when playing the film.

Lace-up frame bar on the cross line of the sprocked wheel

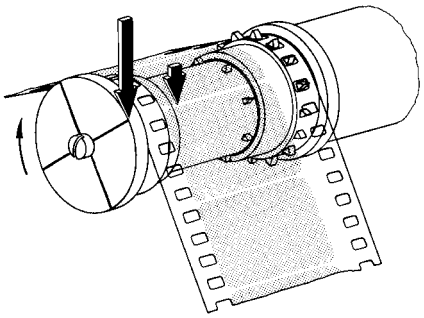


Fig. 320: Film position on the sprocket wheel

2.11 ADJUST FOCUS

- Use Focus Control to adjust the optical sharpness of the film material currently being scanned.
- The focus can be controlled either via LCP or GCP:
  LCP: Switch the scanner to local control mode. Press the Focus button on the LCP (is lit when active), the use the Shuttle wheel to adjust the focus.
  GCP: Switch the scanner in remote control mode. To adjust focus directly slide on the touchscreen or use the adjustment digipot.
- The focus control drives the focus servo in the film scanner.
- Hitting the **Aid** button sets zoom and contour to maximum and slows down the film speed to 6 fps. Thus, film grain will appear as large and clear as possible which helps to find the optimum focus position.

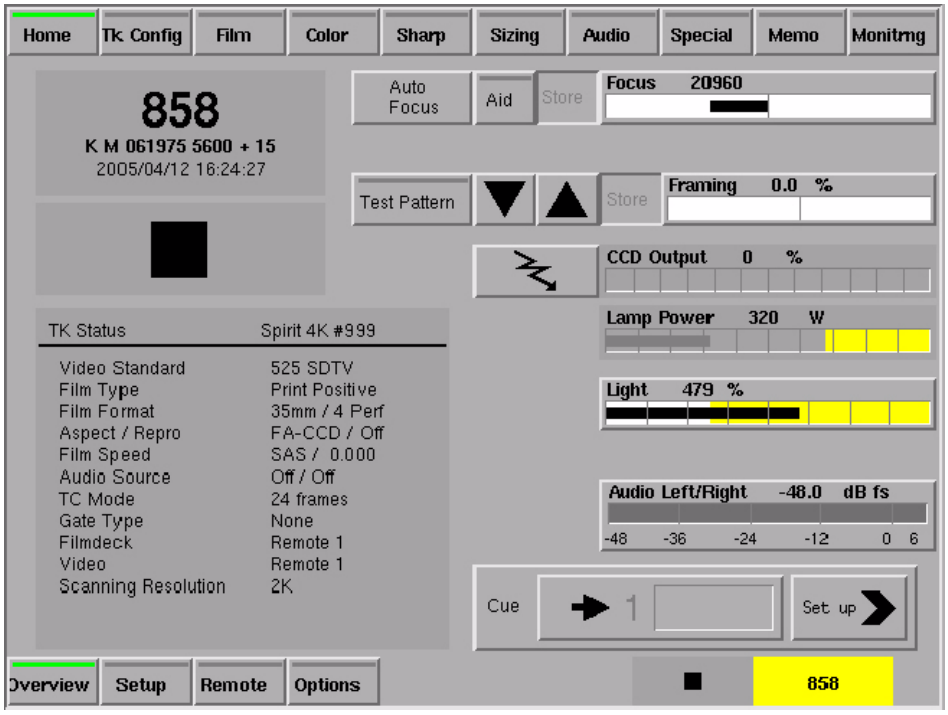


Fig. 321: Home menu with focus adjust slider

- **For factory and service use only:**
  Hitting the **Store** button opens a dialog window. With **OK**, your new setting will be stored and recalled next time when **Unity** is pressed. The default focus setting is important as this value is used during FPN and affects the quality of the FPN.

The usage of effect filters introduced physically in the AIS (Analog Imaging System) by the operator may cause de-focussing of the system. It is therefore recommended to readjust Focus after a filter is applied or removed!

2.12 ADJUST SIZING FORMAT

2.12.1 PRECONDITIONS

The sizing format (scanning and reproduction format) of the film scanner is set in the **Sizing** menu**.**

1. The TV standard (SDC 4000 and SDC 2048 only) or data output mode is selected
2. According to film format (16mm, S16mm, 35mm, S35mm), the suitable optical block is used (see section 2.6.3).
3. The film is threaded correctly (see section 2.9).
4. The framing is adjusted properly (see section 2.10).

2.12.2 SELECT FIXED FILM SCANNING AND REPRODUCTION SETTINGS

[The following section is intended for SDC 4000 / SDC 2048 DataCine only!]

On the film box of the film to be played, the **film scanning format (e.g. 1:1.85 / 1:2.20 / 1:2.35)** is noted in addition to the film format (16mm, 35mm etc.).
If this format corresponds to a fixed format of Fig. 323 (1.85 / 2.20 / 2.35), the following steps are necessary.

- Press button "**Sizing**". The "**Sizing**" menu apperas.

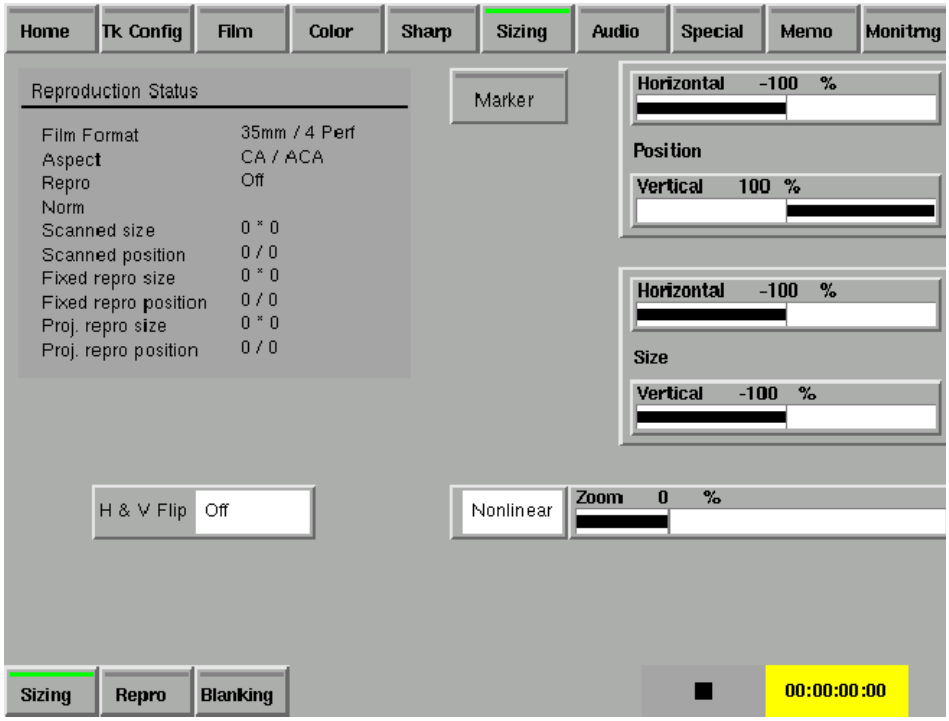


Fig. 322: Sizing menu

- Select submenu “**Repro**”. Select a fixed scan format by pressing “**Fixed Aspect**” and according to the specification of the film scanning format on the film box.

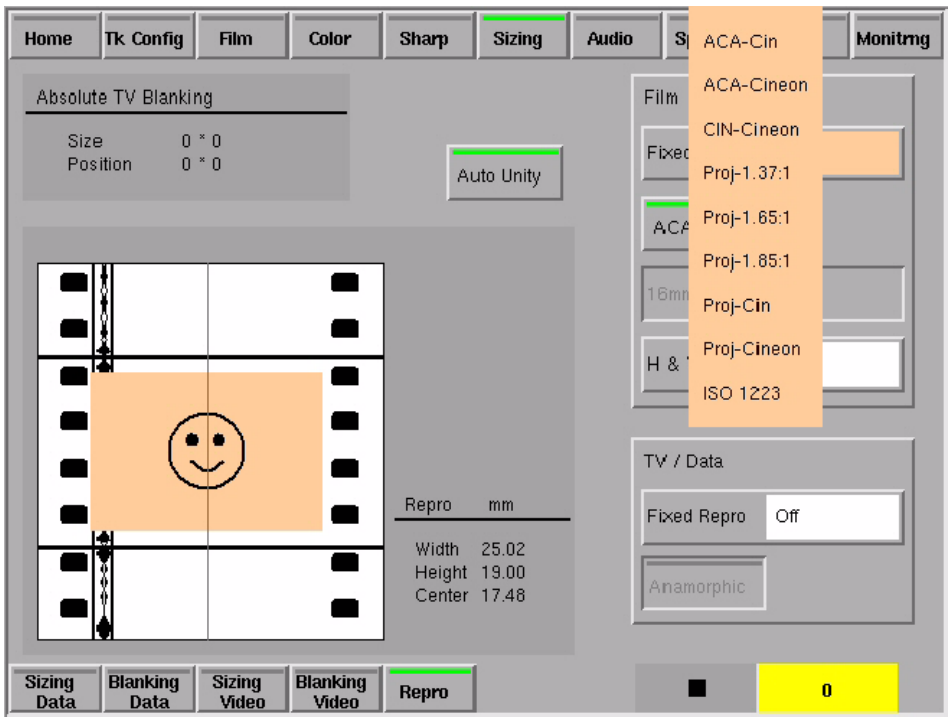
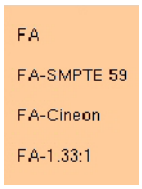


Fig. 323: Sizing menu, submenu Repro

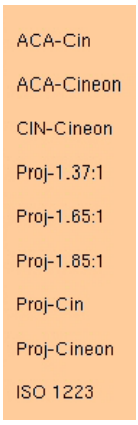
Fixed Aspect
In this window diverse fixed scan settings are selectable. All these settings are strictly film related corresponding to DIN/SMPTE etc. standards.

Selection:

ACE Emul. deselected:



ACE Emul. selected:



Hint:
Invalid ”fixed aspect” formats are displayed on the output monitor as a small horizontal picture window

When selecting a fixed film scanning format, a **suitable reproduction format** is selected each time automatically for this film.
If an other reproduction format should be wanted nevertheless, proceed as follows.

- Press button “**Sizing**“. The “**Sizing**” menu apperas.
- Select submenu “**Repro**”. Select button ”**Fixed Repro**”. The reproduction formats appears on the screen.

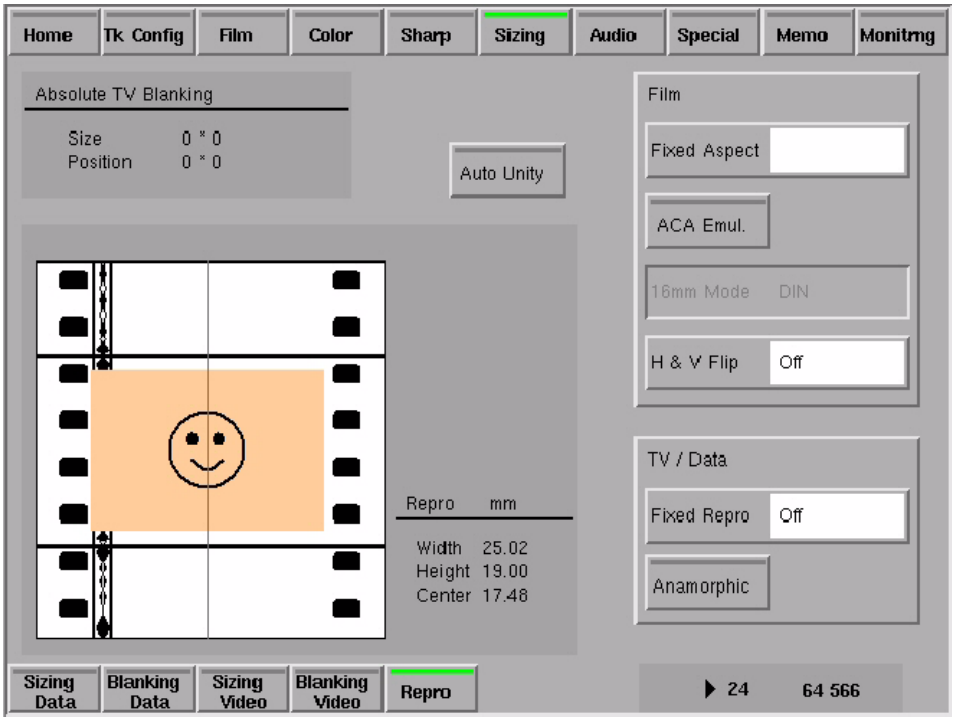


Fig. 324: Sizing / Repro menu

2.12.3 ADJUST SIZING FORMAT VARIABLY

[The following section is intended for SDC 4000 / SDC 2048 DataCine only!]

If the fixed reproduction format does not yet correspond to the requests, the reproduction format can also be adjusted variably.

- Press button "**Sizing**". The "**Sizing**" menu apperas.
- Select "**Size**" window. Sets sizing adjustments to default values.
- Click on the area to activate the digipot control. When active, the sliders are highlighted. Adjust with the digipot or slide on the touchscreen the **vertical** and **horizontal** reproduction format. Pay attention to the picture geometry, i.e. a circle has to be reproduced as a circle.

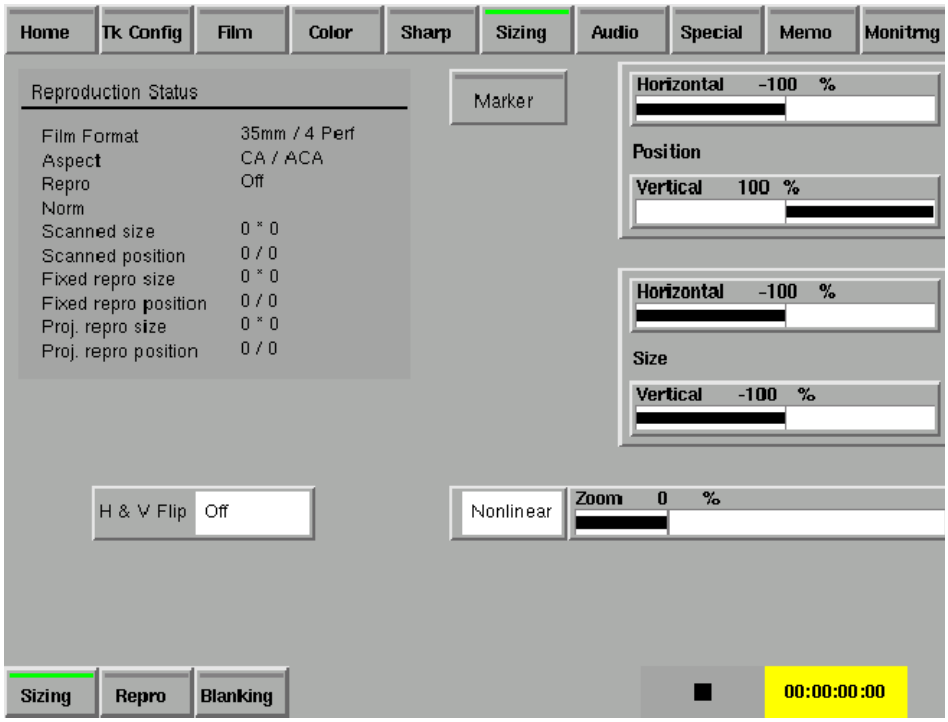


Fig. 325: Sizing menu

2.12.4 ADJUST FILM AND TV BLANKING

- Press button **“Sizing”**. The Sizing menu appears.
- Select submenu **“Blanking”**.

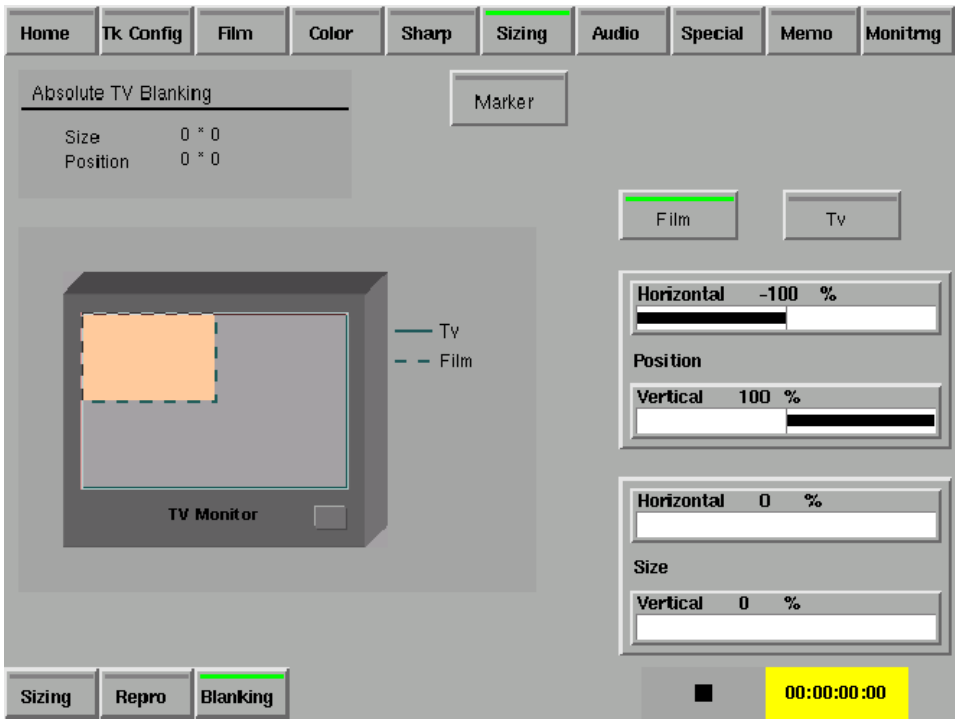


Fig. 326: Submenu ”Blanking”

- Select the **“Film”** button. The Film blanking adjustments (Size and Position) determine the section of the picture which is written into the frame store. Film blanking becomes part of the picture (with only black content)
  Adjust with the digipot or sliders the **vertical blanking**, and the **horizontal blanking**.

2.12.5 RECOMMENDED SETTINGS

Recommended Aperture, Contour, Scaler and Format Processor Settings for Spirit 4K / 2K						
	4K Modes		**4K-to-2K Mode**	**2K Modes**		**HDTV Mode**
Scan Resolution	4K	4K	4K	2K	2K	2K
Image Width / mm	24,58	24,92	24,58	24,58	24,92	24,92
Image Height / mm	18,67	18,93	18,67	18,67	18,93	14,01
Image Resolution	4096 x 3112	4096 x 3112	2048 x 1556	2048 x 1556	2048 x 1556	(1920 x 1080)
Sizing Data, Scaler	ON	1:1	ON	ON	1:1	n.a.
Sizing Data	Unity	n.a.	Unity	Unity	n.a.	n.a.
Sizing Video	n.a.	n.a.	n.a.	n.a.	n.a.	Unity
Sizing Video, Zoom	n.a.	n.a.	n.a.	n.a.	n.a.	134% (22000)
Repro, Fixed Aspect	FA-Cineon	n.a.	FA-Cineon	FA-Cineon	n.a.	FA
Repro, ACA Emulation	OFF	n.a.	OFF	OFF	n.a.	OFF
Repro, Fixed Repro	OFF	n.a.	OFF	OFF	n.a.	16 : 9
Aperture Gain	48%	48%	30%	35%	35%	35%
Aperture Peak	100%	100%	39%	100%	100%	100%
Contour (Gain)	n.a.	n.a.	n.a.	n.a.	n.a.	20%
Contour Balance	n.a.	n.a.	n.a.	n.a.	n.a.	H3/V3
Contour Coring	n.a.	n.a.	n.a.	n.a.	n.a.	0%
Contour Peaking Horizontal	n.a.	n.a.	n.a.	n.a.	n.a.	100%
Contour Peaking Vertical	n.a.	n.a.	n.a.	n.a.	n.a.	100%

= unity settings

n.a. = not applicable

Recommended Settings for 35mm Scanning Formats, 4 Perf:

FILM			TV DATA				IMAGE SIZE**				REFERENCE
Gate Block	ACA Emulation	Fixed Aspect	TV Ration	Ana-morphic	Fixed Repro	Ratio	4K Pixel	4K Lines	2K Pixel	2K Lines	
FA35	off	FA	4:3 & 16:9	off	off	1,312	4096	3124	2048	1562	4KFA35 LGA max. scanning area
FA35	off	FA	4:3 & 16:9	off	4:3	1,333	4096	3072	2048	1536	4KFA35 LGA scanning width => 4:3
FA35	off	FA-SMPTE 59	4:3 & 16:9	off	off	1,335	4096	3068	2048	1534	SMPTE 59 Style C scanning area
FA35	off	FA-SMPTE 59	4:3 & 16:9	off	4:3	1,333	4092	3068	2046	1534	SMPTE 59 Style C scanning width => 4:3
FA35	off	FA-SMPTE 59	4:3 & 16:9	off	16:9	1,778	4096	2304	2048	1152	SMPTE 59 Style C scanning width => 16:9
FA35	off	FA-SMPTE 59	4:3 & 16:9	off	CINEON	1,316	4096	3112	2048	1556	SMPTE 59 Style C scanning width => 1,32:1
FA35	off	FA	4:3 & 16:9	Exp	off	2,623	4096	1560	2048	780,0	4KFA35 LGA scanning width, anamorphic
FA35	off	FA	4:3 & 16:9	Exp	4:3	1,333	2082	1562	1041	781	4KFA35 LGA scanning width, anamorphic => 4:3
FA35	off	FA	4:3 & 16:9	Exp	16:9	1,778	2776	1562	1388	781	4KFA35 LGA scanning width, anamorphic => 16:9
FA35	off	FA	4:3 & 16:9	Exp	1.85:1	1,850	2888	1562	1444	781	4KFA35 LGA scanning width, anamorphic => 1,85:1
FA35	off	FA-CINEON	4:3 & 16:9	off	off	1,316	4040	3068	2020	1534	Cineon Full Aperture, 1:1 mode
FA35	off	FA-CINEON	4:3 & 16:9	off	off	1,316	4096	3112	2048	1556	Cineon Full Aperture, spatial process
FA35	off	FA-1.33:1	4:3 & 16:9	off	off	1,333	3944	2956	1972	1478	DIN 15502 part 6, SMPTE 96M 1,33:1
FA35	ACA	ACA*	4:3 & 16:9	off	off	1,375	3616	2628	1808	1314	DIN/SMPTE academy camera aperture
FA35	ACA	ACA*	4:3 & 16:9	off	4:3	1,333	3616	2712	1808	1356	DIN/SMPTE academy camera aperture => 4:3
FA35	ACA	ACA*	4:3 & 16:9	off	16:9	1,778	3616	2034	1808	1017	DIN/SMPTE academy camera aperture => 16:9
FA35	ACA	ACA-CIN*	4:3 & 16:9	off	off	1,183	3616	3056	1808	1528	SMPTE 59-1998 style B (academy camera aperture area)
FA35	ACA	ACA-CIN*	4:3 & 16:9	Exp	off	1,183	4096	1730	2048	865	SMPTE 59-1998 style B (with anamorphic expansion)
FA35	ACA	ACA-CIN*	4:3 & 16:9	Exp	4:3	1,333	4096	3072	2048	1536	SMPTE 59-1998 style B => 4:3
FA35	ACA	ACA-CIN*	4:3 & 16:9	Exp	16:9	1,778	4096	2304	2048	1152	SMPTE 59-1998 style B => 16:9
FA35	ACA	ACA-CIN*	4:3 & 16:9	Exp	1.85:1	1,850	4096	2216	2048	1108	SMPTE 59-1998 style B => 1,85:1
FA35	ACA	ACA-CINEON*	4:3 & 16:9	off	off	1,372	3606	2628	1803	1314	Cineon Academy, 1:1 mode
FA35	ACA	ACA-CINEON*	4:3 & 16:9	off	off	1,372	3656	2664	1828	1332	Cineon Academy, 4K / 4K => 2K / 2K spatial process
FA35	ACA	CIN-CINEON*	4:3 & 16:9	off	off	1,175	3606	3068	1803	1534	Cineon Cinemascope, 1:1 mode
FA35	ACA	CIN-CINEON*	4:3 & 16:9	off	off	1,175	3656	3112	1828	1556	Cineon Cinemascope, 4K / 4K => 2K / 2K spatial process

* Currently not supported by Gate Block 4K 35 GB!

** Recommended settings for image size without blanking

FILM			TV DATA				IMAGE SIZE**				REFERENCE
Gate Block	ACA Emulation	Fixed Aspect	TV Ration	Ana-morphic	Fixed Repro	Ratio	4K Pixel	4K Lines	2K Pixel	2K Lines	
FA35 & ACA35	ACA	PROJ-1.37:1	4:3 & 16:9	off	off	1,371	3444	2512	1722	1256	SMPTE 195 Style C scanning area
FA35 & ACA35	ACA	PROJ-1.65:1	4:3 & 16:9	off	off	1,650	3444	2088	1722	1044	SMPTE 195 Style A 1,65:1 scanning area
FA35 & ACA35	ACA	PROJ-1.85:1	4:3 & 16:9	off	off	1,850	3446	1864	1723	932	SMPTE 195 Style A 1,85:1 scanning area
FA35 & ACA35	ACA	PROJ-CIN	4:3 & 16:9	off	off	1,196	3446	2884	1723	1442	SMPTE 195 Style B (scanning area)
FA35 & ACA35	ACA	PROJ-CIN	4:3 & 16:9	Exp	off	1,196	3446	2884	1723	1442	SMPTE 195 Style B (with anamorphic expansion)
FA35 & ACA35	ACA	PROJ-CIN	4:3	Exp	4:3	1,333	1920	1440	960	720	SMPTE 96M 2,39:1 Full Screen 4:3
FA35 & ACA35	ACA	PROJ-CIN	16:9	Exp	16:9	1,778	2562	1442	1281	721	SMPTE 96M 2,39:1 Full Screen 16:9
FA35 & ACA35	ACA	PROJ-CIN	4:3 & 16:9	Exp	2.39:1	1,195	3444	2882	1722	1441	SMPTE 96M 2,39:1
FA35 & ACA35	ACA	PROJ-CINEON	4:3 & 16:9	off	off	1,316	3444	2616	1722	1308	SMPTE 195 Style A 1,66:1 width, Cineon FA aspect ratio
FA35 & ACA35	ACA	PROJ-CINEON	4:3 & 16:9	off	off	1,316	4096	3112	2048	1556	SMPTE 195 Style A 1,66:1 width, Cineon FA aspect ratio
FA35 & ACA35	ACA	ISO 1223	4:3 & 16:9	off	4:3	1,333	3308	2482	1654	1241	ISO 1223, SMPTE 96M, EBU R86 scanning area
FA35 & ACA35	ACA	ISO 1223	4:3 & 16:9	off	16:9	1,778	3308	1860	1654	930	SMPTE 96M, EBU R86 scanning area

** Recommended settings for image size without blanking

2.13 MATCHING OF FILM TYPES

2.13.1 PRECONDITIONS

Precondition for this section are the preceding sections of this chapter. The most important ones are:

1. Film scanner user-specifically configurated
2. FPN correction performed
3. Film threaded
4. Framing optimized
5. Picture optically focused
6. Sizing format adjusted

2.13.2 FILM MATCHING PROCEDURE

- Press button **“Film”**. The Film menu appears.

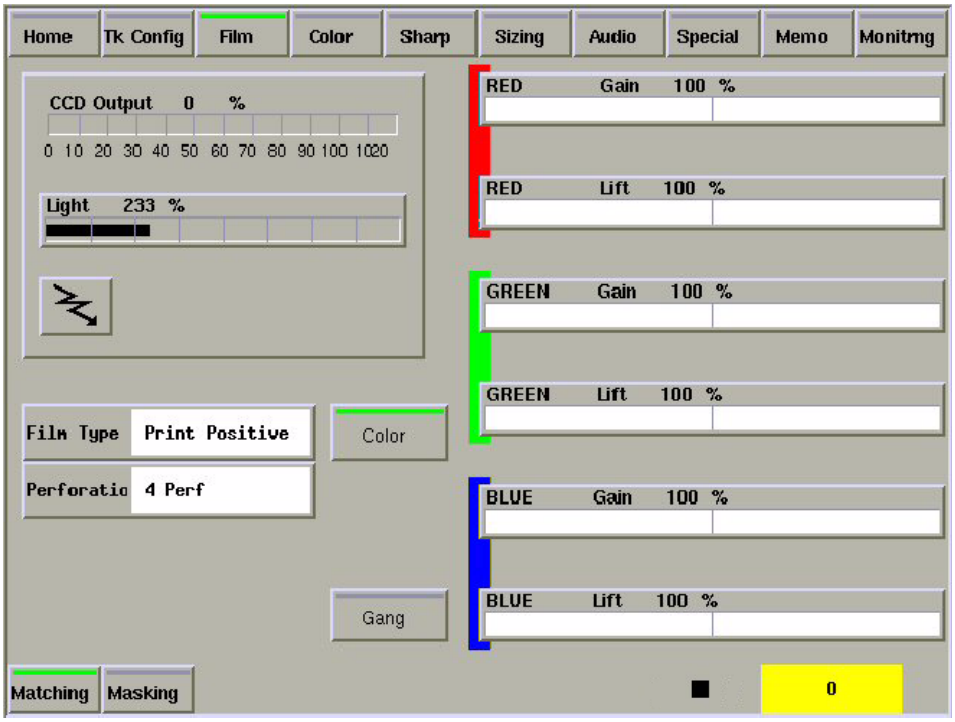


Fig. 327: Film menu

- Double click hard key **”Unity”** recalls untity values for all controls of this menu page.

- Select **“Film Type”**:
  This selection controls the filter wheel servo. The Spirit 4K / 2K filter wheel provides optical filters for print negative and Intermediate material.
  Different filters are used achieved optical pre-matching for the currently scanned filter type (filter mask compensation).
  Click on the button and make your choice from the dropdown menu. For each of the three filter types positive and negative mode is available. Selecting negative mode performs an inversion of the signal.

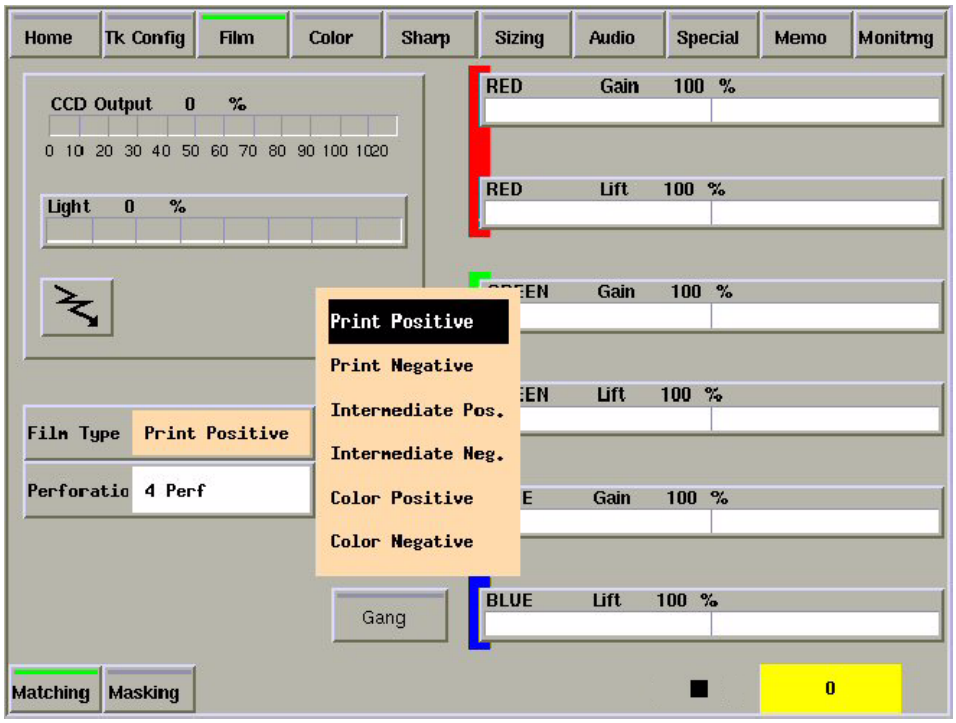


Fig. 328: Film menu with drop down menu ”Film Type”

2.13.3 ADJUST FILM MASKING

- For specific corrections, select submenu **“Masking”**.

Fig. 329: Submenu ”Film masking with pull-down menu matrix

- Type in the name for the new matrix. Confirm by pressing the **“OK”** button. Now the coefficients in the matrix window can be modified.
- Clicking on the coefficients opens a numeric keypad on the top of the menu. Type in the modification or dial the corresponding digipot. Confirm by pressing “**OK**”.

2.13.4 ADJUST INTENSITY OF FILM ILLUMINATION

- Press menu button **"Film"**. The Film menu appears.

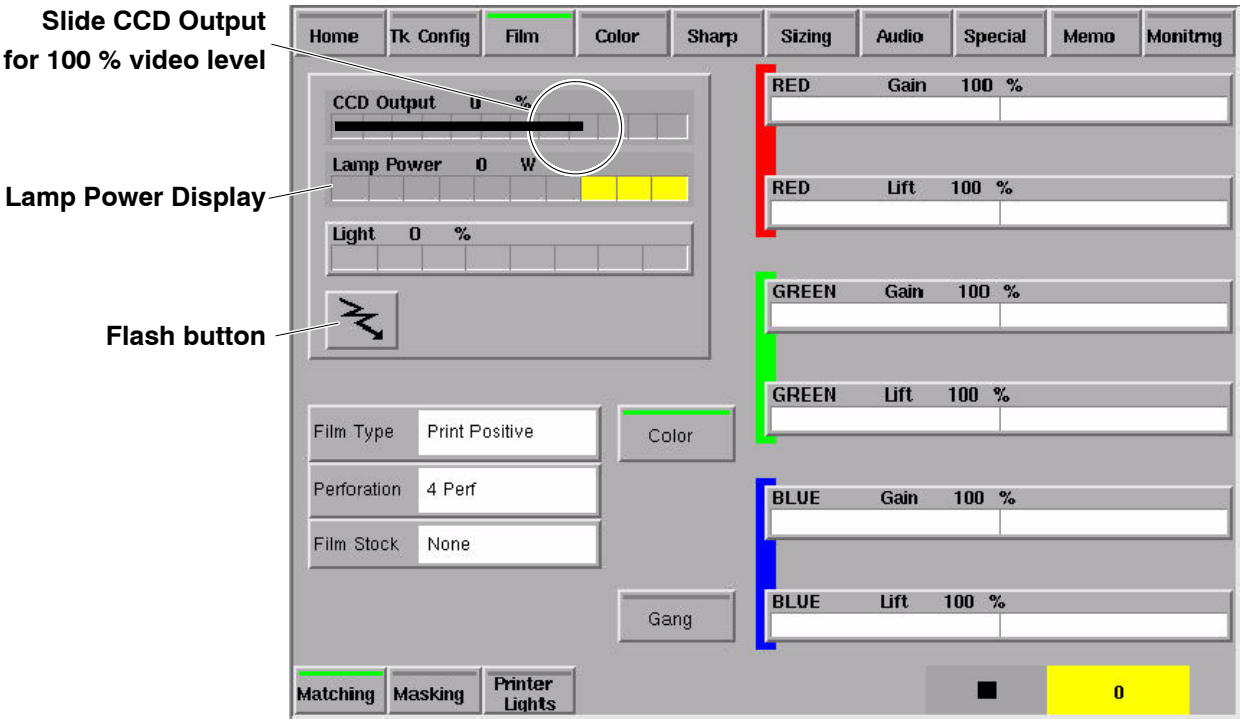


Fig. 330: Film menu

For test purposes use Testpoint 1 in Menu Monitoring

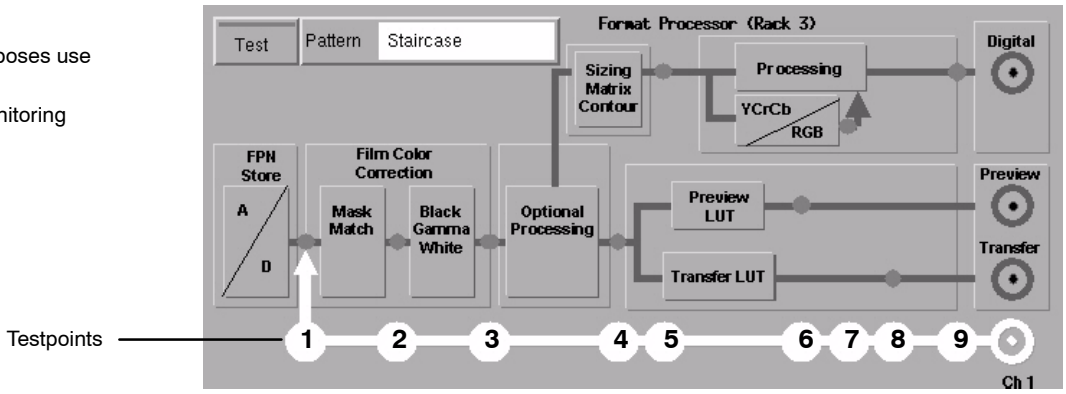


Fig. 331:Menu Monitoring

- Shift slider **"Light"** or use the trackball. The amount of light falling via the film on the CCDs can be controlled.
- Run film for adjusting the intensity of film illumination. Search for a scene with low film density framebars (bright lights, clouds or similar) and adjust the intensity of film illumination in such a way that the brightest one of the RGB video signals reaches a level of 100 % (oscilloscope).
- **CCD Output Level Display:**
  During adjustment watch the CCD Output Level Display!
  Make sure that this level is around 85%.

Or during Play:
Pressing the **"Flash"** button sets film illumination intensity at once to maximum CCD output level.
If 100 % video level is not reached, switch video basic gain to + 6 dB and adjust the film illumination intensity again.

- Observe the indication of the **Lamp Power**. Do not operate in the critical area (yellow marked). This can lead to unwished intencity fluctuations in the picture.

- Rewind film

2.13.5 ADJUST ANALOG SIGNAL BASIC GAIN

[Future function, not implemented yet!]

- Press button **"Gain"**. Opens pull down menu and shows the possible selections for **analog basic gain**.

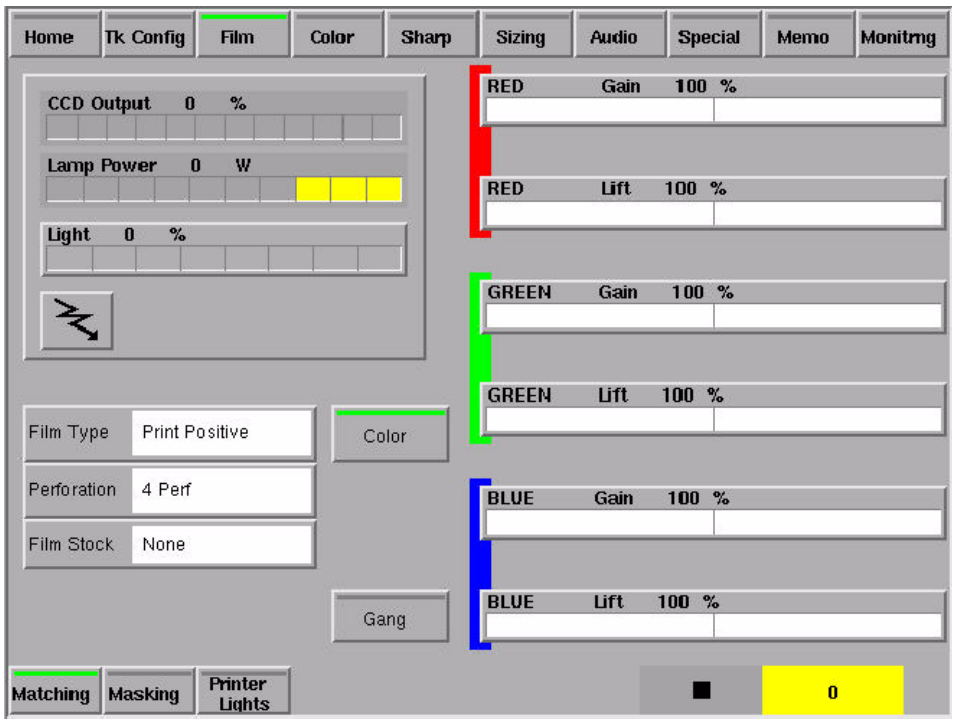


Fig. 332: Film menu with pull down menu Gain

- Run film for judging the film density. With very dense film material, use basic gain **"6 dB"**.

For test purposes use Testpoint 1 in Menu Monitoring

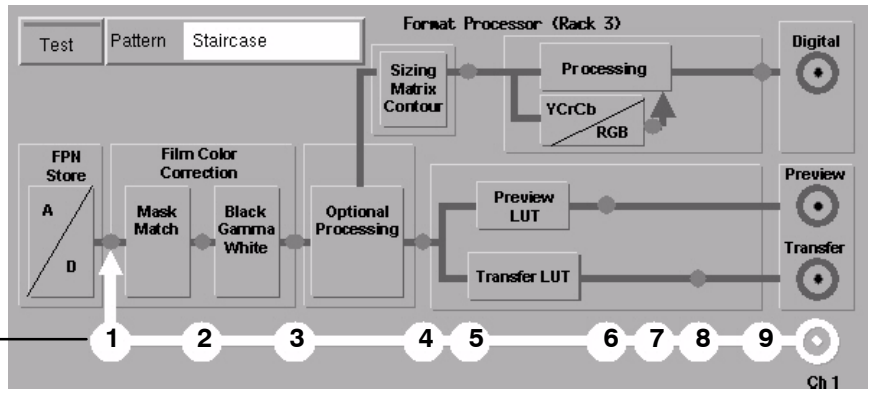


Fig. 333:Menu Monitoring

2.13.6 ADJUST LIFT & GAIN (BLACK & WHITE SIGNAL LEVEL RANGE)

- Press menu button **"Film"**. The Film menu appears.

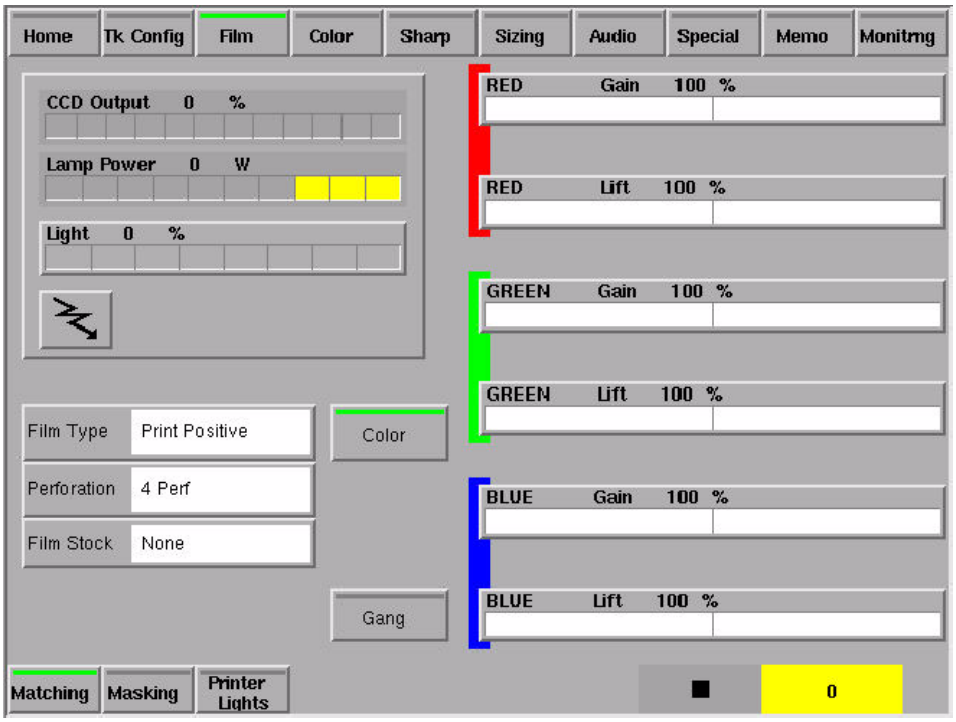


Fig. 334: Film menu

For test purposes use Testpoint 2 in Menu Monitoring

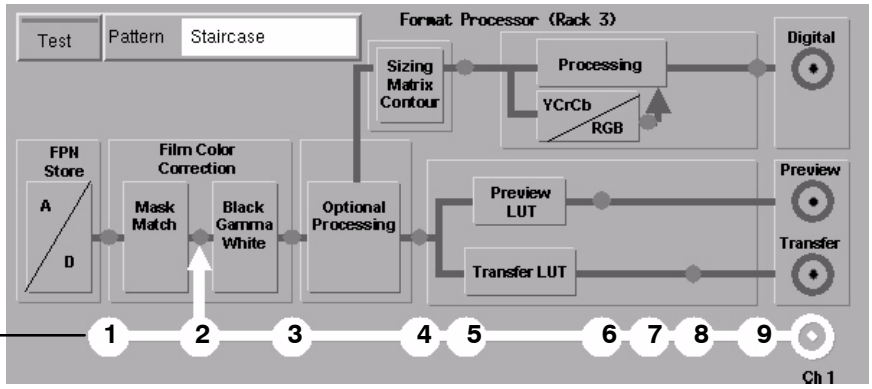


Fig. 335: Menu Monitoring, submenu Test Pnt

- Run film scanner to adjust the white level (and then the black level). Search for a scene with picture white (or picture black) and stop.
- Adjust picture white in the R, G and B channels with the corresponding digipot controls or by sliding on the touch screen matching **Gain** in all channels to 100 % video signal.
  Adjust picture black in the R, G and B channels in matching **lift** RGB to 1 % setup. This is the **basic adjustment** for the film to be sanned.
- Rewind film. **Color corrections** during later operation (scene for scene) are made via the **Color menu**.

2.13.7 ADJUST BLACK LEVEL (BLACK MASTER & BLACK RGB)

- Press menu button **"Color"**. The Color menu with submenu Primary color correction appears.

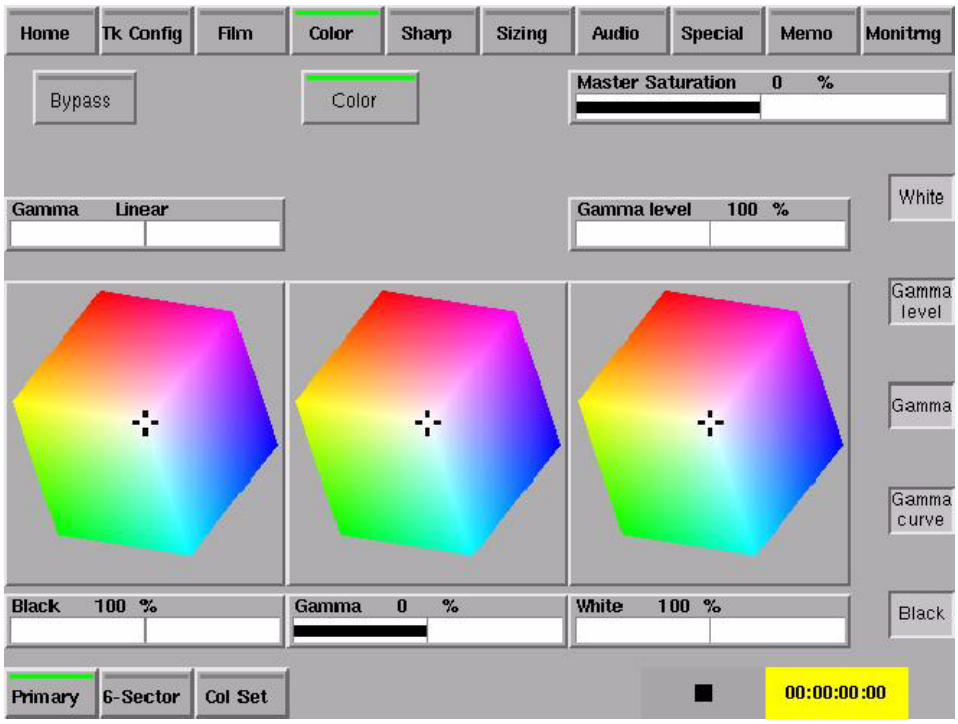


Fig. 336: Color menu

For test purposes use Testpoint 3 in Menu Monitoring

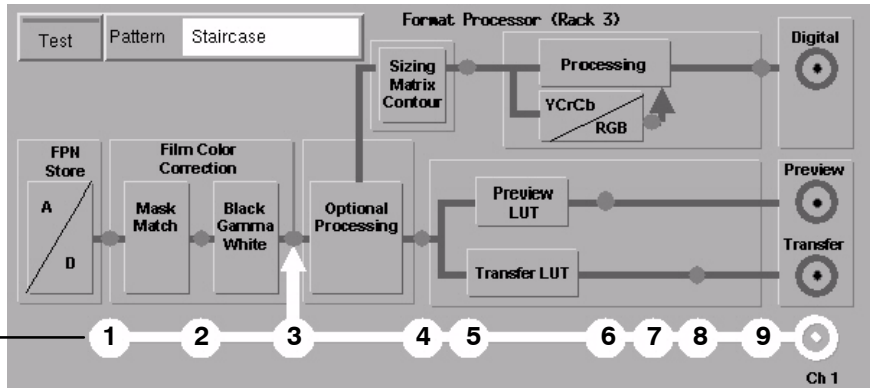


Fig. 337:Menu Monitoring, submenu Test Pnt

- Run film for adjusting the **black levels.** Search for a film scene with a **black object** and stop.
- **Black Master** controls the dark parts of the picture. Slide Black on the touch-screen or use the corresponding digipot. Adjust the relevant channels to **1 %** black signal level.
  Adjustments of Black Master and Black RGB do not change White level.

- **Black RGB** magnitude and phase for R, G or B black level adjustment.Slide directly on the colored hexagon of the touchscreen or use the trackball. By clicking on the area around the hexagon, the control is delegated to the trackball. The cursor inside the hexagon indicates the working position.
  Adjust until the desired color balace in the blocks is achieved.
- Rewind film.

2.13.8 ADJUST WHITE LEVEL (WHITE MASTER & WHITE RGB)

- Run film for adjusting the **white levels.** Search for a film scene with a **white object** and stop.

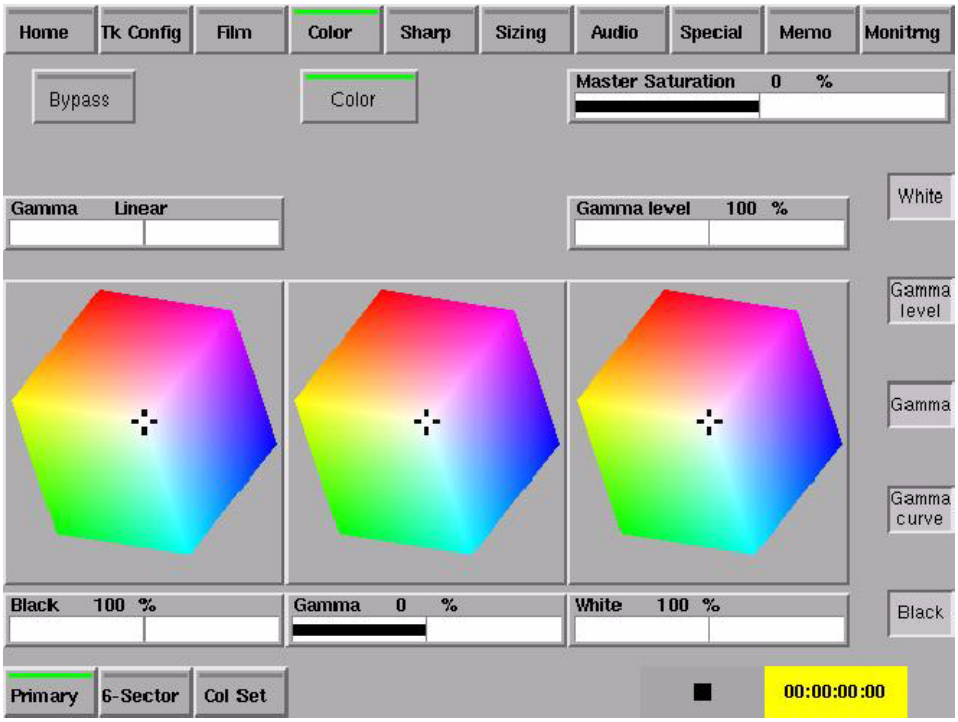


Fig. 338: Color menu

- **White (Master)** slide White on the touch screen or use the corresponding digipot. Adjust the relevant channels to **100 %** white level.
- **White (RGB)** magnitude and phase for R, G or B white level adjustment
  Slide directly on the colored hexagon of the touchscreen or use the trackball. By clicking on the area around the hexagon, the control is delegated to the trackball. The cursor inside the hexagon indicates the working position.
  Use this controls until desired color balance in the light is achieved.
  Adjustments of White Master and White RGB do not change Black level.

2.13.9 ADJUST GRAY LEVEL (GAMMA MASTER & GAMMA RGB)

- Run film for adjusting the medium gray levels. Search for a film scene with a **medium gradation** and stop.

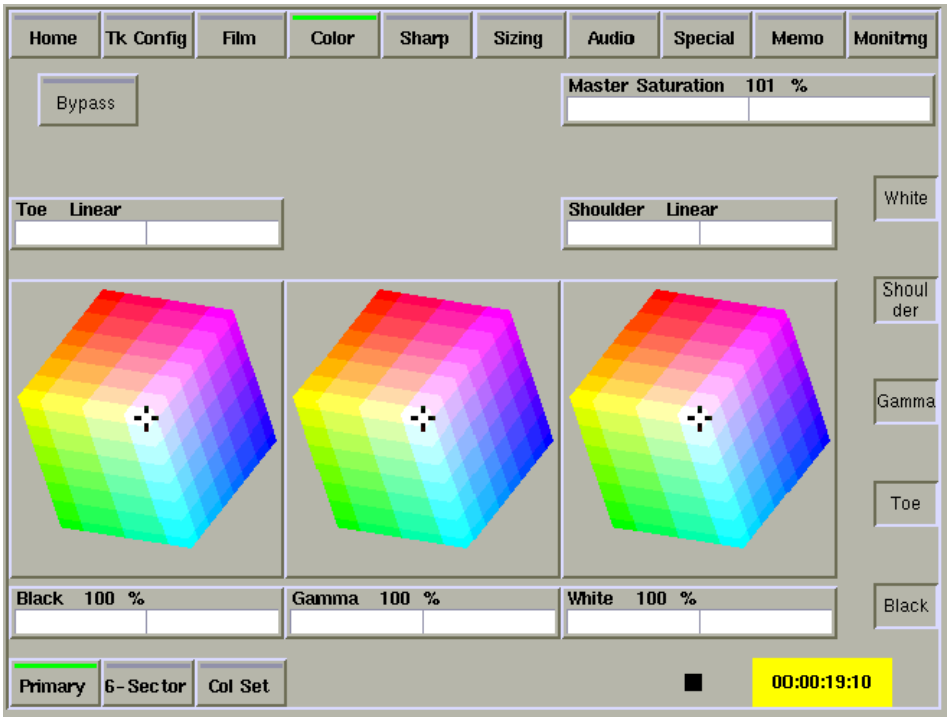


Fig. 339: Color menu

- **Select Gamma** slide Gamma on the screen**.** The relevant channels become adjustable for the gray levels.
- **Gamma RGB** magnitude and phase for R, G or B gray level adjustment. Slide directly on the colored hexagon of the touchscreen or use the trackball. By clicking on the area around the hexagon, the control is delegated to the trackball. The cursor inside the hexagon indicates the working position.
  The actual adjustment is displayed with cursor in the Gamma hexagon. The adjustments are judged on the color monitor and changed until a desired color balance in the mid tones is achieved.
- Rewind film.

2.13.10 ADJUST CONTOUR AND CORING

[This section is intended for SDC 4000 and SDC 2048 DataCine only!]

- Select "**Sharp**" menu.

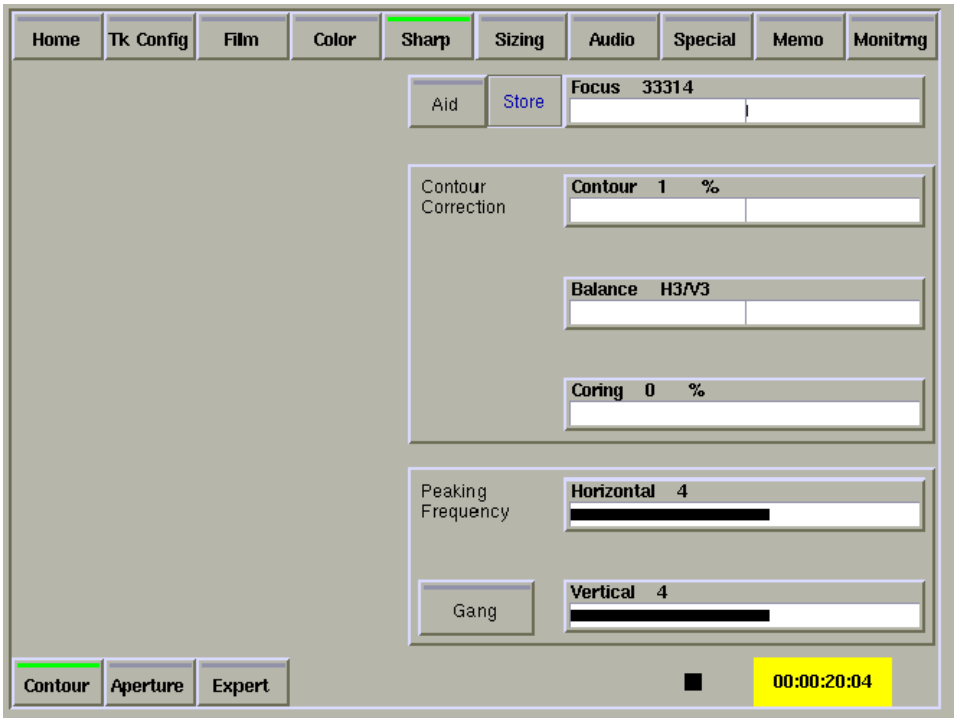


Fig. 340: Sharp menu

For test purposes use
Testpoint 5
in Menu Monitoring

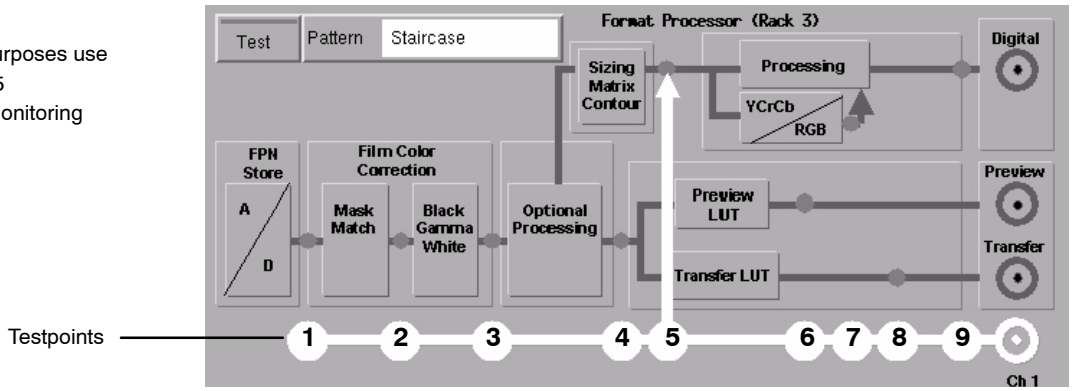


Fig. 341:Menu Monitoring, submenu Test Pnt

- **Select Contour**
  For adjustment search an appropriate film picture and operate the film scanner in the stop mode.
  Contour adjustment: Picture with fine and coarse details
  Coring adjustment: Picture with noise in the black areas.

- Select “**Aperture**” menu.

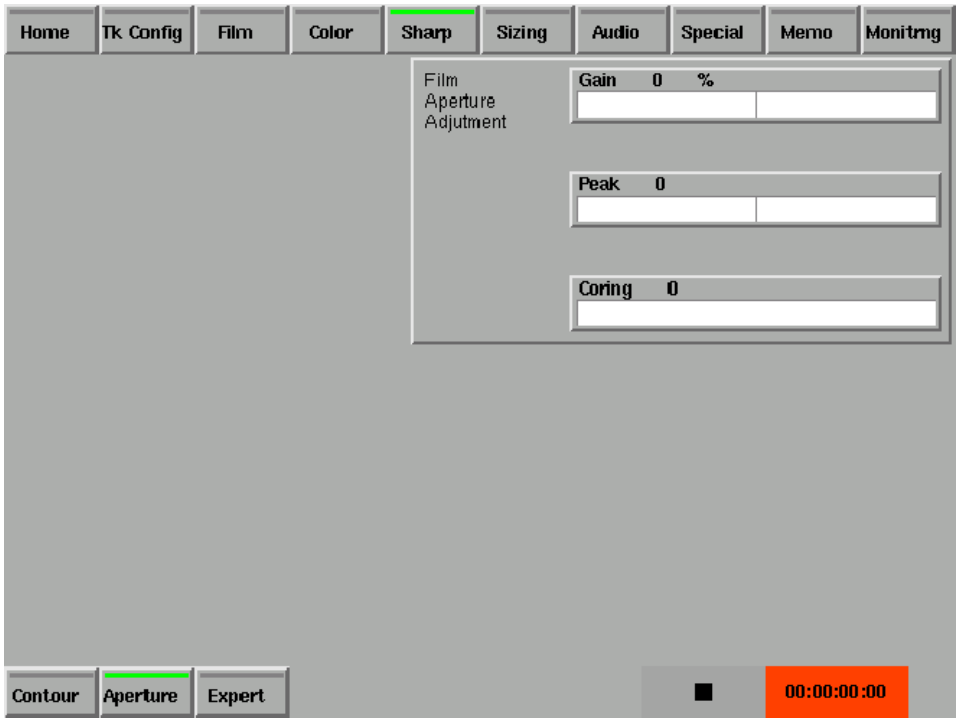
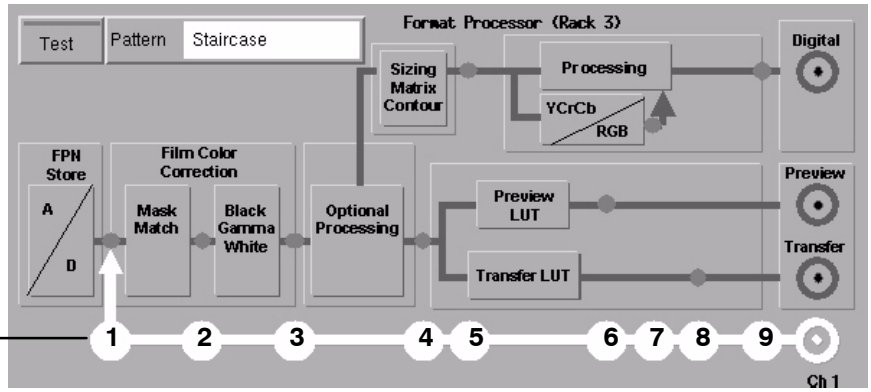


Fig. 342: Sharp menu

For test purposes use
Testpoint 1
in Menu Monitoring



- **Select Aperture**
  This adjustment only addresses the luminance signal. A Black and White transition appears more contrasty and therefore sharper.

2.14 AUTOMATIC SWITCHING-OFF

The film scanner includes three automatic switching–off functions.

1. Film end switching-off (Auto stop)
2. Film break switching-off
3. Thermal switching-off

2.14.1 FILM END SWITCHING-OFF

In the **Play**▷ or **Play**◁ mode, the film is spooled out completely and the film drive is stopped automatically when the end of film is reached.

In the **Shtl**▷ or **Shtl**◁ mode, the film speed is reduced from maximum to normal speed and then stopped when the end of film is reached.
Pressing the **Shtl** button once more spools the film out completely and the film drive is stopped automatically.

The end-of-film switching-off function is enabled again by pressing the **Stop** button on the Local Control Panel.

2.14.2 FILM BREAK SWITCHING-OFF

In the **Play**▷ , **Play**◁ and **Shtl**▷ or **Shtl**◁ modes, the film drive is stopped immediately in case of a film break.
After a short time, the pilot light of the **Stand by** button on the Local Control Panel turns off and the **Stop** button lamp starts flashing.

2.14.3 THERMAL SWITCHING OFF

To avoid overheating problems caused by too high temperature of the outgoing air, a thermal switch is installed into the Film Scanner.

Mains will be switched off when the exhaust air exceeds a temperature of 55°C ± 4°C (131ºF ± 39ºF).

Thomson guarantees operation at an ambient temperature of maximum 35°C (95ºF). The temperature of the exhaust air is normally by 10°C (50ºF) higher than the intake air. If the ambient temperature rises up to 40°C (104ºF) and higher, damage to a running system is possible.

In such a case the machine is disconnected from the mains and further operation is only possible after the ambient temperature was reduced.

The thermal switch is performed with a hold function and the mains voltage can only be switched on via a reset button of this switch (see figure below)

In case the Film Scanner cannot be repowered:

- Set the power switch in position ”**off**”
- Open the rear doors

- Check the mains power connection:
  - Mains voltages at the Mains Terminal Board
  - 3 (2) phase circuit breaker
- Push the reset button of the internal thermal switch (figure below).

- Close the rear doors
- Switch on the machine

2.14.4 MANUAL EMERGENCY SWITCHING-OFF

In an **emergency** case, the film scanner can be switched off **immediately** with the **Power** switch (on the right side of the local control panel) without any risk for the film scanner or the film.

3. MENU CONTROL

3.1 MENU STRUCTURE

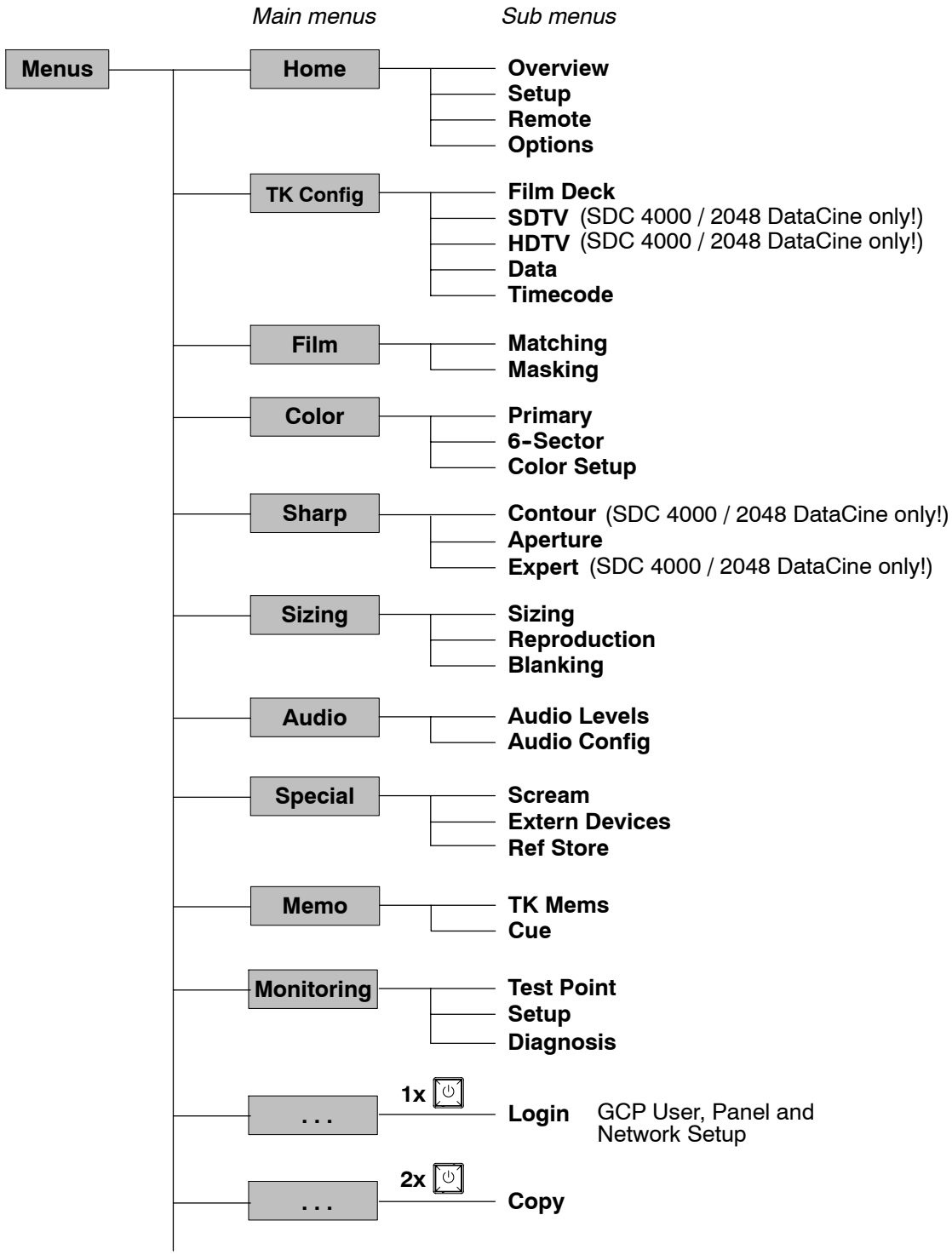
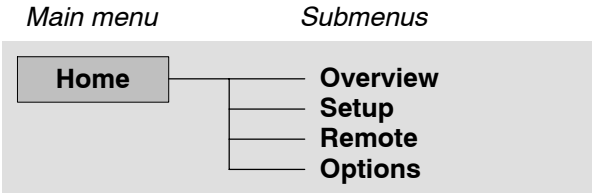


Fig. 301: Menu structure of the Graphical Control Panel GCP1

3.2 HOME MENU

The Home menu appears automatically after having switched on the GCP. It displays the current machine status and allows to control some of the most important film scanner functions.



3.2.1 SUBMENU “OVERVIEW”

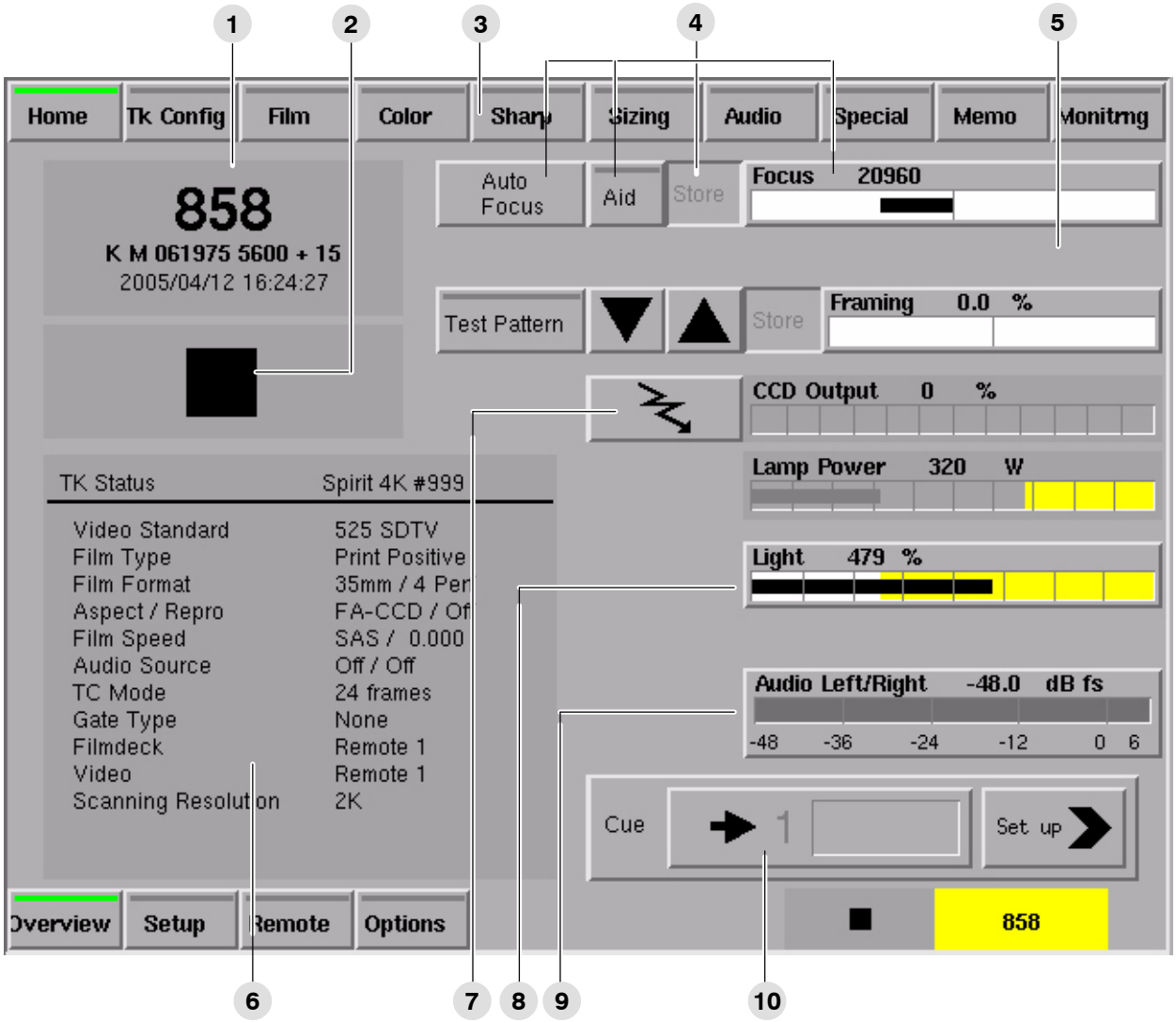


Fig. 302: Main menu **“Home”** / submenu **“Overview”**

1 **Display** of current time code shows the value in
hours : minutes : seconds : frames

Additionally display of the keycode:
Manufact. ID; Film ID; Prefix - Filmroll; Count film lenght in feet; Offset in frames and Date & Time.

2 **Operating Display**

The operating display of the film deck status; informs about film drive mode (PLAY, SEARCH, STEP, film run direction, film speed, stop status, if no film is threaded (”no film”) and indicates that the film scanner is operating in the remote mode (”no contr.”).

3 **Test Pattern**

Switches the test signal on or off. The preselection of the test signal (staircase, sawtooth, color bar a.s.o.) is made in the main menu **“Home”** within submenu **“Setup”**.

ON:	Test signal
OFF:	Film signal

4 **Focus**

Use Focus Control to adjust the optical sharpness of the film material currently being scanned.The focus can be controlled either via LCP or GCP:

LCP:	Switch the scanner to local control mode.
[future function]	Press the Focus button on the LCP (is lit when active), and use the Shuttle wheel to adjust the focus
GCP:	Switch the scanner in remote control mode. To adjust focus directly slide on the touchscreen or use the adjustment digipot.

The focus control drives the focus servo in the film scanner.

Hitting the **Aid** button sets zoom and contour to maximum and slows down the film speed to 6 fps. Thus, film grain will appear as large and clear as possible which helps to find the optimum focus position.

For factory and service use only:
Hitting the **Store** button opens a dialog window. With **OK**, your new setting will be stored and recalled next time when **Unity** is pressed.The default focus setting is important as this value is used during FPN and affects the quality of the FPN.

Auto Focus (in preparation)

5 **Framing**

With this control, the frame line of the film frame is coarsely shifted into the vertical blanking interval and thus made imperceptible.

Coarse **“DOWN”**
Softkey assignment only available for 35mm film.

After pressing the action button ▼, the frame line is shifted by 1/4 of picture height downward.

Coarse **"UP"**
Softkey assignment only available for 35mm film.
After pressing button ▲, the frame line is shifted by 1/4 of picture height upwards.

Adjust **"FINE"**
This control servesto fine-turn the frame line. Therefore use the adjacent digipot or slide on the touchscreen. The control's display shows the selected frame line in deviation in %. Thus, framing adjustments become reproducible.

For factory and service use only:
Hitting the **Store** button opens a dialog window. With **OK**, your new setting will be stored and recalled next time when **Unity** is pressed.The default focus setting is important as this value is used during FPN and affects the quality of the FPN.

6 The general information list provides short information about essential basic settings of the Machine Type (2K / 4K), Video Standard, Film Format, Aspect / Repro, Fixed speed, Audio source, TC mode, Gate type, Filmdeck, Video, Audio, Size and Monitoring, Local and Remote Delegation.

7 **Shot button**
serves (during Play) to set the CCD output to 100% video level at once.

8 **Illumination Adjustment Light**
Serves for setting the intensity of film illumination, adjusting the video level and Xenon lamp current display. When exiting the selection, the last illumination intensity value is stored.

CCD Output is the signal level derived from the scanner head.
This is set using LIGHT which is the illumination or light level of the film. The aim is to achieve that sufficient light is available to capture D-Min (minimum density) of the negative or D-Max (maximum density) on a Print. The CCD Output level should be up to 100%.

NOTE!
Observe the indication of the "Lamp Power". Do not operate in the critical area (yellow marked). This can lead to unwished intencity fluctuations in the picture.

9 **Audio Level Left & Right** (Option)
Indicates the current audio levels of the two audio channels (Left / CH 1 and Right / CH 2) as well as the current position of the level controls for audio Out 1 and 2.

10 **Cue / Timecode**
Serves to cue the Film Scanner to the defined timecode visible in the button display. If no cue point is defined or if the Setup buttons pressed, the main menu "Memo" submenu "Cue" for setup of the cue points is opened.

3.2.2 SUBMENU “SETUP”

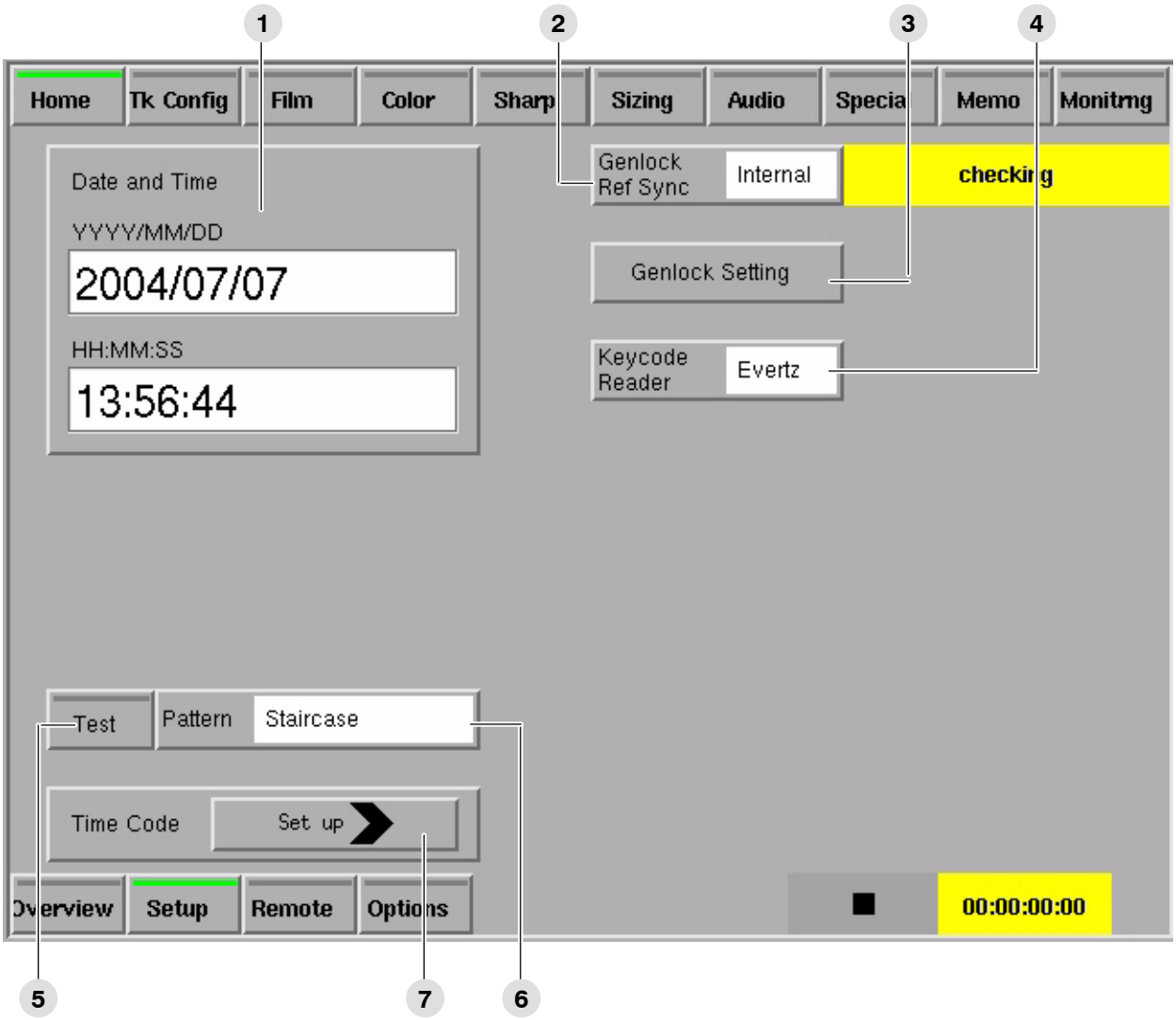


Fig. 303: Main menu **“Home”** / submenu **“Setup”**

1 **Setting Date and Time**

Select the Date & Time windowSetting Date & Time is done via numeric key-line and the action buttons **(“OK”**, **“Cancel”**, **“Clear”, “<--”)** at the bottom.

Actuating the **“Cancel”** button interrupts the film tc setting.

“Clear” sets the TC value to zero.

The button **“<--”** shifts the digits of the TC value backwards.

2 **Genlock Ref Sync** (only with Format Processor Rack 3)

Switches over to different genlock reference sync signals.
The meanings and the possible selections of the individual parameters are explained below. Factory adjustments are **underlined**.

Selection: **Internal** / Ext1 / Ext2 / Ext3 / Serial

”Int”	film scanner is synchronized internally (runs free)
”Ext1”	film scanner is synchronized by sync signal SYNC 1 on terminal panel Rack 3
”Ext2”	film scanner is synchronized by sync signal SYNC 2 on terminal panel Rack 3
”Ext3”	film scanner is synchronized by sync signal SYNC 3 on terminal panel Rack 3
”Serial”	film scanner is synchronized by sync signal SER REF on terminal panel Rack 3

The state of the selected signal is displayed in yellow field on the right of the button.

3 **Genlock setting:** Sub-dialog appears

Genlock Sub Pixel Delay

Changes the pixel delay to less than 1 pixel.
Selection: **0** / 1 to 255 pixel parts

”0”	Delay: none
”1-255”	Delay: 1 to 255 pixel parts

Genlock Pixel Delay

Changes the genlock delay to pixel increments.
Selection: **0** / 1 to 4095 pixels

”0”	Delay: none
”1-4095”	Delay: 1 to 4095 pixels

Genlock Line Delay

Changes the genlock delay to line increments.
Selection: **0** / 1 to 4095

”0”	Delay: none
”1-4095”	Delay: 1 to 4095 lines

Rack2 - 3 Delay

Switches on or off Rack 2 - Rack 3 Delay
Selection: **OFF** / ON

”OFF”	Delay off
”ON”	Delay on; value depending from parameter “Rack 2 - Rack 3 Delay”

Note!
Parameter “Rack 2 - Rack 3 Delay” is used to match the genlock generator delay to the delay of a color corrector, operating between Rack 2 and Rack 3 (e.g. Pogle MegaDef 1)

Rack2 - 3 Delay (Bar graph)
Changes the genlock delay from 0 to 30 ore more line increments
Selection: **0** / 1 to 30 lines

”0”	Delay: none
”1-30”	Delay: 1 to 30 lines

4 **Keycode Reader**

Selection of the mounted keycode reader “EVERTZ” or “AATON”.

5 **Test Pattern**

Switches the test pattern (–signal) on or off. The preselection of the test signal (”Staircase”, “Sawtooth”, “Color Bars” ...) is made in the dropdown menu “Pattern” within submenu **“Setup”**.

ON:	test signal
OFF:	film signal

6 **Pulldown Menu Pattern**

This pulldown menu serves to select the test signals.

Overview

The meanings of the individual test signals are explained below.

”Staircase”	Test signal	”staircase”
”Sawtooth_100”	Test signal	”sawtooth 0 -100%”
”Colorbar”	Test signal	”color bar”
”Sawtooth_14”	Test signal	”Ramp 0 -14%”
“10% Video Level”	Test signal	“10% video level, for monitor adjustment” *****
“90% Video Level”	Test signal	“90% video level, for monitor adjustment” *****

***** To achieve this video levels, set following parameters**:**

Color correction - unity; CRT gamma - on; film type - Print pos.;

”60% Video Level”	Test signal	“60% video level (area)”
”Black”	Test signal	“black”

7 **Time Code Setup**

This button opens the main menu “TK Config” / submenu “Time Code” as described in chapter 3.3.6, Menu TK Config, submenu Timecode

3.2.3 SUBMENU “REMOTE”

If a film scanner has to be controlled from several remote panels, consider the following:

In order to avoid problems with parallel operation, the default setting of the GCP should always be REMOTE 2. When changing the remote address of the GCP, the film scanner has subsequently to be restarted.

This submenu serves to select the control interfaces for Film Deck, Video- Audio Amps, Scanning System and Monitoring from which the film scanner is remote-controlled via the adequate pulldown menu.

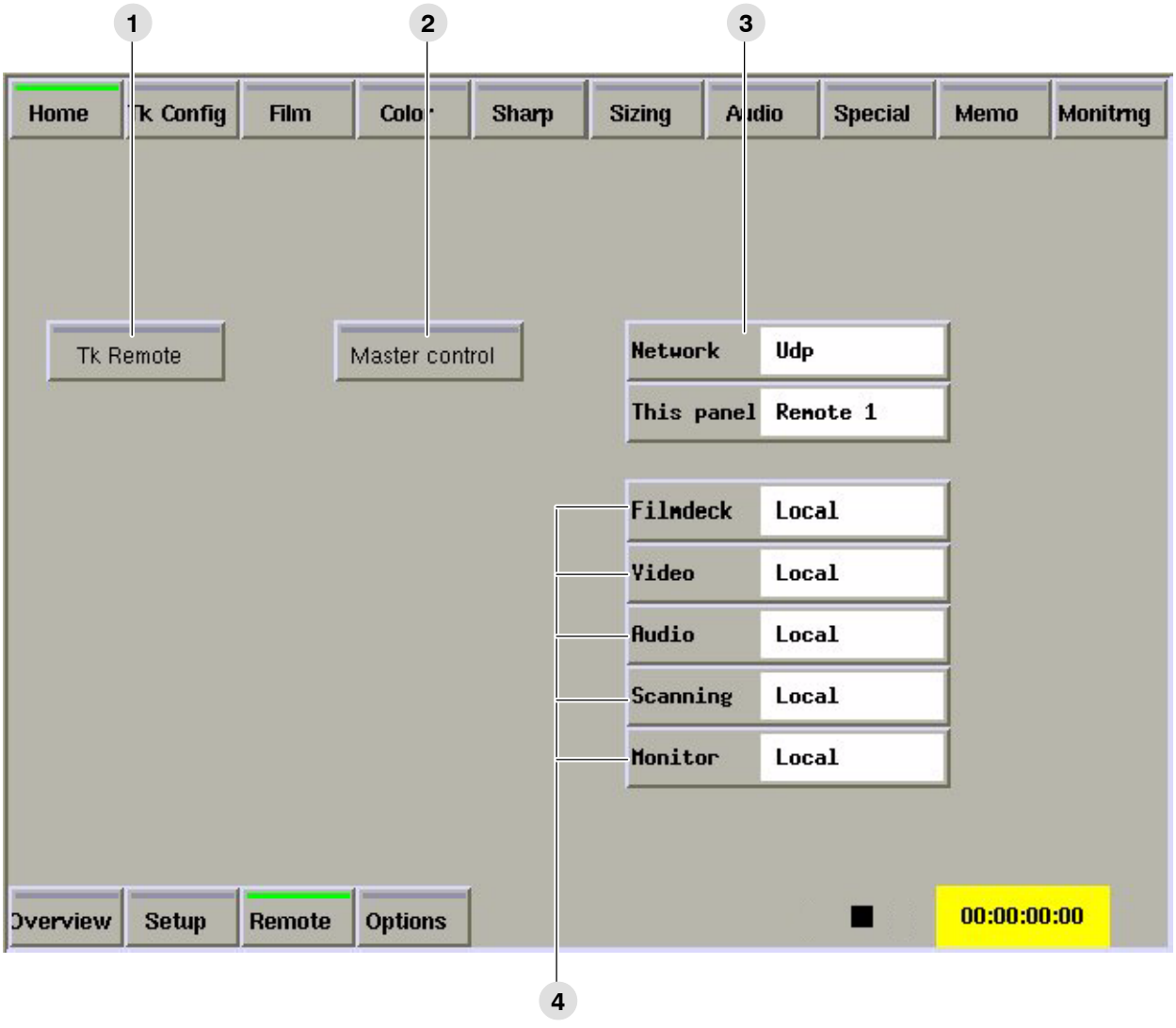


Fig. 304: Submenu **“Remote”**

1 **TK Remote**

The “Tk Remote” toggle switch delegates the selected control functions of the film scanner either to the GCP (Rem1) or to the local control panel.

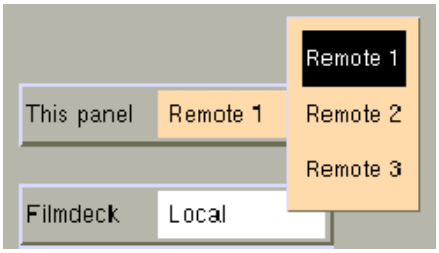
2 **Master Control**

The “Master control” button sets all remoteable functions like filmdeck, video & audio amps, the scanning system and monitoring selection to Remote1 or Local control.

3 **This Panel**

For connecting the GCP to Remote 1 - 3

If a film scanner has to be controlled from several remote panels (FCP and GCP), consider the following:
In order to avoid problems with parallel operation, the default setting of the GCP should always be REMOTE 2. When changing the remote address of the GCP, the film scanner has subsequently to be restarted.



4 Selects remote interface for the **Filmdeck** / **Video** / **Audio** / **Scanning**:

Filmdeck:
For controlling the **filmdeck**, optionally via the own **(Local)** control panel or an external control panel.
Remote 1 to 3 are iMCS (Cheapernet) control connections.
Rem 1 is provided for the Graphical Control Panel and Rem 2 and 3 for external color corrections.
Rem ote 4, 5 are RS422 interfaces for connecting an editor or a filmdeck control panel. Only for future use.
Parallel is a parallel interface for connecting a control panel with reduced filmdeck functions.

Video:
The function applies to control of the **video amplifier**, alternatively local or external via Rem 1 to Rem 3.

Audio (Option):
The function applies to control of the **audio amplifier**, alternatively local or external via Rem 1 to Rem 3.

Scanning:
The function applies to control of the **sizing**, alternatively local or external via Rem 1 to Rem 3.

3.2.4 SUBMENU “OPTIONS”

This submenu displays the activated and available options of the film scanner. Entering the appropriate **“option code”** from the Thomson “License Document” activates the desired features.

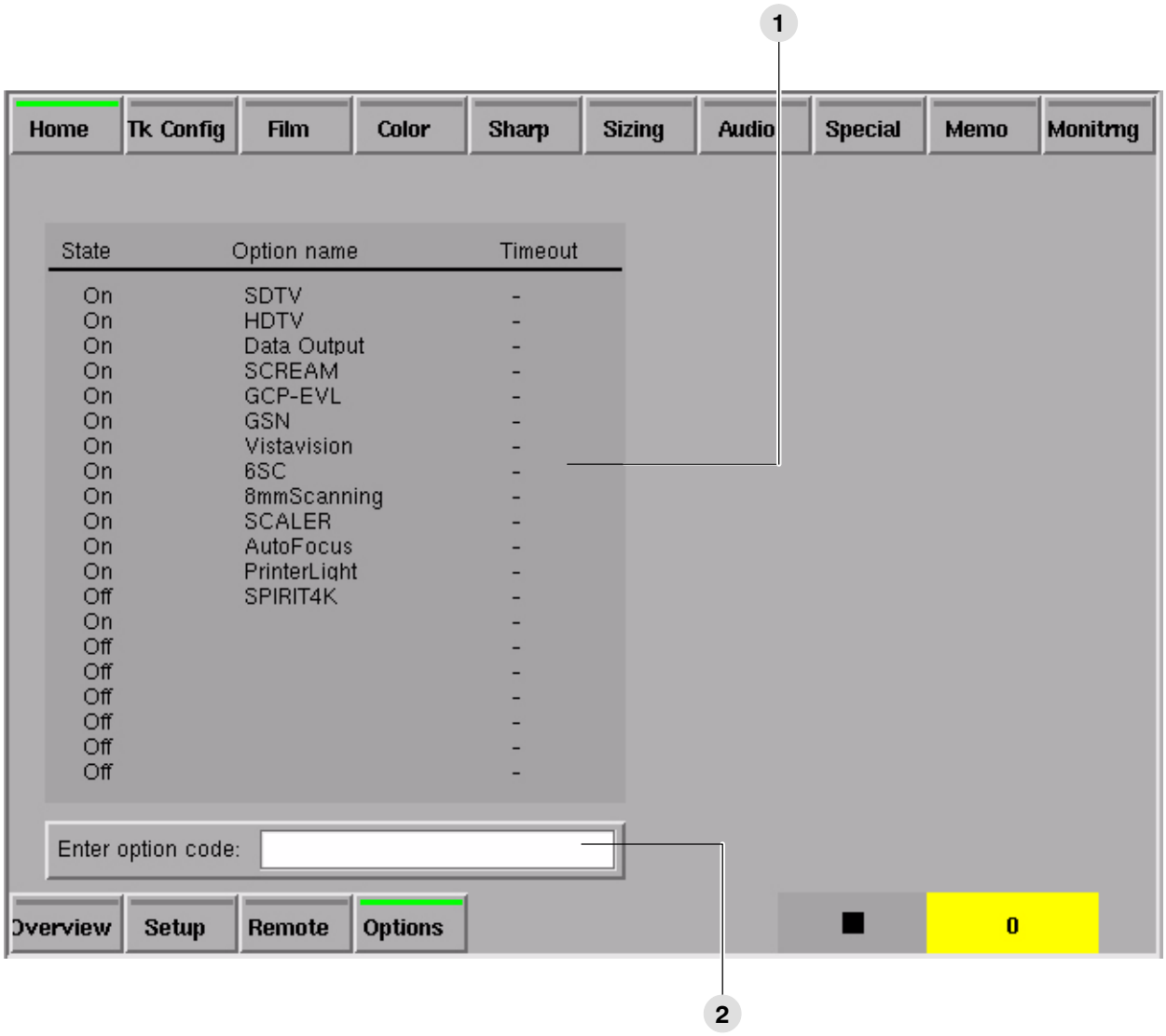


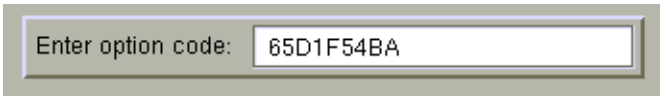
Fig. 305: Submenu **“Options”** with the numeric data keypad and control buttons

1 Display of active and available options

2 **Enter Option Code**

Procedure:
Selecting the **"Enter option code"** edit field opens a two lined keyborard with numbers 0 to 9 and characters A to F above the display and the control buttons **"OK"**, **"Cancel"**, **"Clear"** and **"<--"** on the bottom side of the submenu.
The option code can be input by using the data keyboard. It writes the option code into the **"Enter option code"** display.

To enter the option code, press the **"OK"** button.



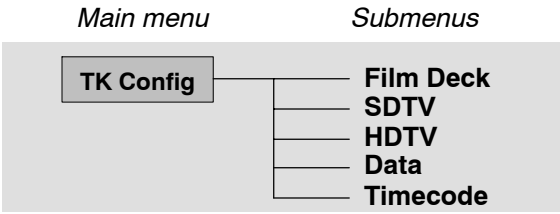
Note!
The "Enter option code" is cancelled automatically after a while without any actions.

The license code string consists of 5 times 4 characters or numbers. If the decoding of the license code string was successful the menu shows the name of the new option. If this option has a time limit, this limit will be shown in the column **"Timeout.**
An error message **"invalid license code!"** appears, if the Spirit 4K / 2K Film Scanner cannot decode the license code string.
Perhaps you made a typing error during entry or the license document belongs to another Spirit 4K / 2K unit.

In this case verify the product type and the serial no. of the Film Scanner shown in the main menu Diagnosis corresponds to the entries in the License Document(s)**.**

Now you can enter another License Code or leave the submenu **"Options"**.

3.3 TK CONFIG MENU



3.3.1 SUBMENU “FILM DECK”

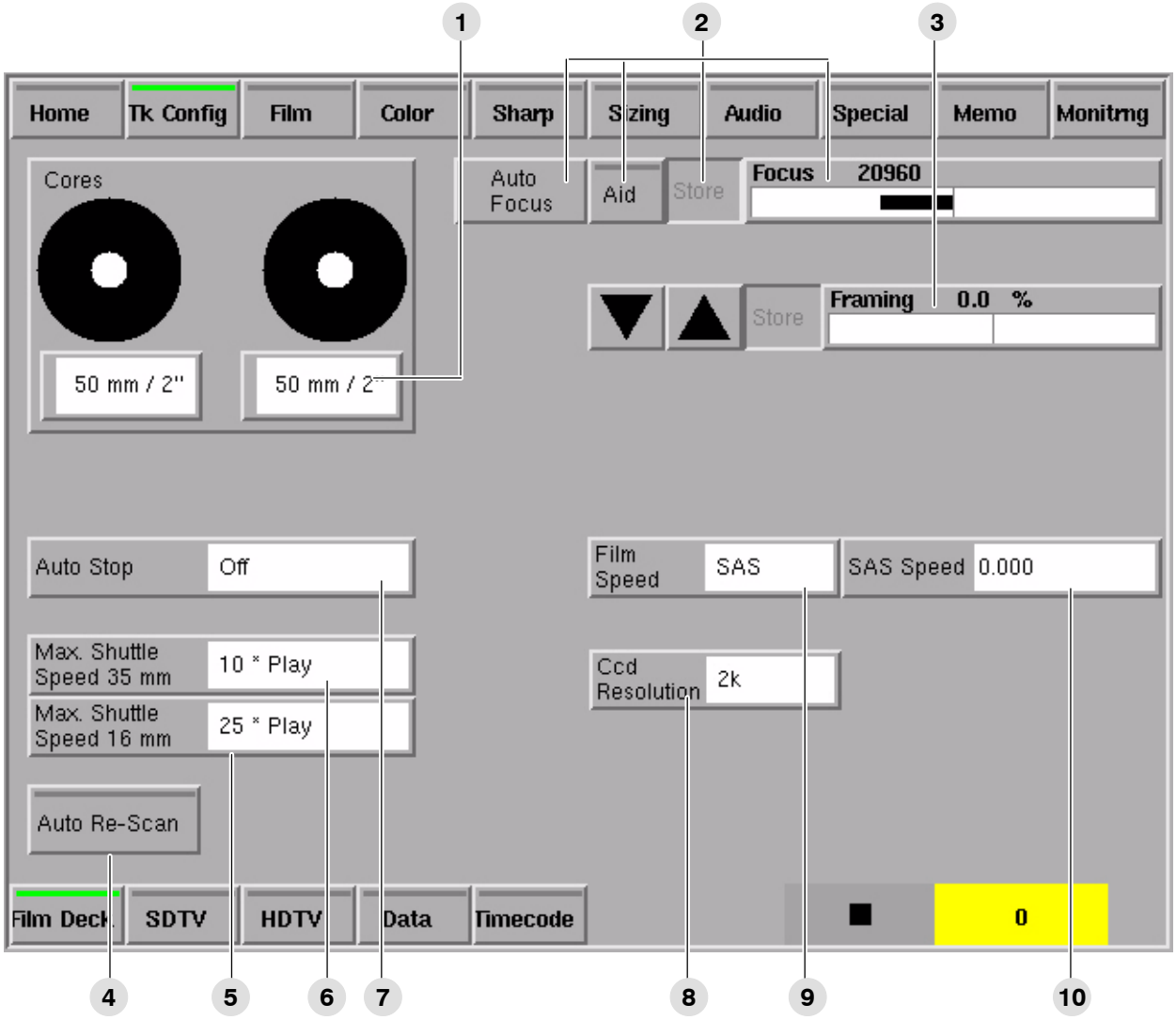


Fig. 306: Main menu **“Tk Config”** / submenu **“Film Deck”**

1 **"Cores" diameter left / right**

Adjustment of the used bobbin or film reel diameters (separately for the left and right reel spindle).
Important for determining the correct film supply indication and for the function "auto stop" (see below)!

Selection: 50, **75**, 100, 124, 150 mm
(Thomson recommends not to use 45 and 50 mm bobbins).

2 **Focus**

Use Focus Control to adjust the optical sharpness of the film material currently being scanned.The focus can be controlled either via LCP or GCP:

LCP:	Switch the scanner to local control mode.
[future function]	Press the Focus button on the LCP (is lit when active), and use the Shuttle wheel to adjust the focus
GCP:	Switch the scanner in remote control mode. To adjust focus directly slide on the touchscreen or use the adjustment digipot.

The focus control drives the focus servo in the film scanner.

Hitting the **Aid** button sets zoom and contour to maximum and slows down the film speed to 6 fps. Thus, film grain will appear as large and clear as possible which helps to find the optimum focus position.

For factory and service use only:
Hitting the **Store** button opens a dialog window. With **OK**, your new setting will be stored and recalled next time when **Unity** is pressed. The default focus setting is important as this value is used during FPN and affects the quality of the FPN.

Auto Focus (in preparation)

3 **Framing**

With this control, the frame line of the film frame is coarsely shifted into the vertical blanking interval and thus made imperceptible.
As default factory settings are stored for all film formats in 2K and 4K mode.

NOTE!
Adjust framing only in PLAY forward mode!

Coarse **"DOWN"**
Softkey assignment only available for 35mm film. After pressing the action button ▼, the frame line is shifted by 1/4 of picture height downward.

Coarse **"UP"**
Softkey assignment only available for 35mm film. After pressing button ▲ , the frame line is shifted by 1/4 of picture height upwards.

Adjust **"FINE"**
This control servesto fine-turn the frame line. Therefore use the adjacent digipot or slide on the touchscreen. The control's display shows the selected frame line in deviation in %. Thus, framing adjustments become reproducible.

For factory and service use only:
Hitting the **Store** button opens a dialog window. With **OK**, your new setting will be stored and recalled next time when **Unity** is pressed. The default framing setting is important as this value is used during FPN and affects the quality of the FPN.

4 **Auto Re-Scan**

Automatic rescan of the frame displayed after changing a machine setting influencing the processing or capturing before the frame store (e.g. focus, illumination, 6 dB gain, film type changes etc.)

Selection: Off / On

5 **Max Shuttle Speed 16mm**

Determines the maximum shuttle speed for 16 mm films.

Selection: 2 to **25 times the normal speed**

6 **Max Shuttle Speed 35mm**

Determines the maximum shuttle speed for 35 mm films.

Selection: 2 to **10 times the normal speed**

7 **Auto Stop**

Determines automatic Film Deck stop shortly before film end.

Attention: Adjust always the correct "core diameter" (see above)!

Selection: **off** / Shuttle / Shuttle + Play

"off" automatic Film Deck stop switched off
"Shuttle" automatic Film Deck stop only in shuttle mode
"Shuttle + Play" automatic Film Deck stop in shuttle and play modes

SPIRIT 4K

8 **CCD Resolution**

Selection of the CCD resolution of the film scanner: "2K" / "4K".

9 **Film Speed**

This pull down menu serves to adjust the fixed or variable film speed for the film scanner.

Fixed film speeds at **625**/**1250L**/**50Hz**:
6 1/4, 12 1/2, 18 3/4, 25 frames/s
as well as a preselected variable film speed (SAS = Select a Speed)

Fixed film speeds at **525**/**1125L**/**60Hz**:
6, 12, 18, 24, 30 frames/s
as well as a preselected variable film speed (SAS = Select a Speed)

10 **SAS Speed**

Selected **SAS**, the film scanner is changed over to a **variable** film transport speed. The bar graph **"SAS Speed"** shows the variable film speed adjusted last. The film scanner will then run at this speed.
The display, attached to the bar, shows the selected variable film speed in FPS (frames per second).
Thus, film speed adjustments become reproducible.

Variable film speeds SAS:
Range from **2.000** to **57.000** fps for all standards.

For setting push the **"SAS Speed"** bar graph.
Numerical buttons will appear at the top of the screen.
Type the requested speed and enter with the Ok-button below.

ATTENTION - SAS Restrictions:
In the HD standards "segmented Frames" and "Progressive" the output frame of the HDTV/DTV output can be composed of field 2 from the last scanned frame & field 1 of the current scanned frame.

3.3.2 SUBMENU “SDTV”

[The following section is intended for SDC 4000 / SDC 2048 DataCine only!]

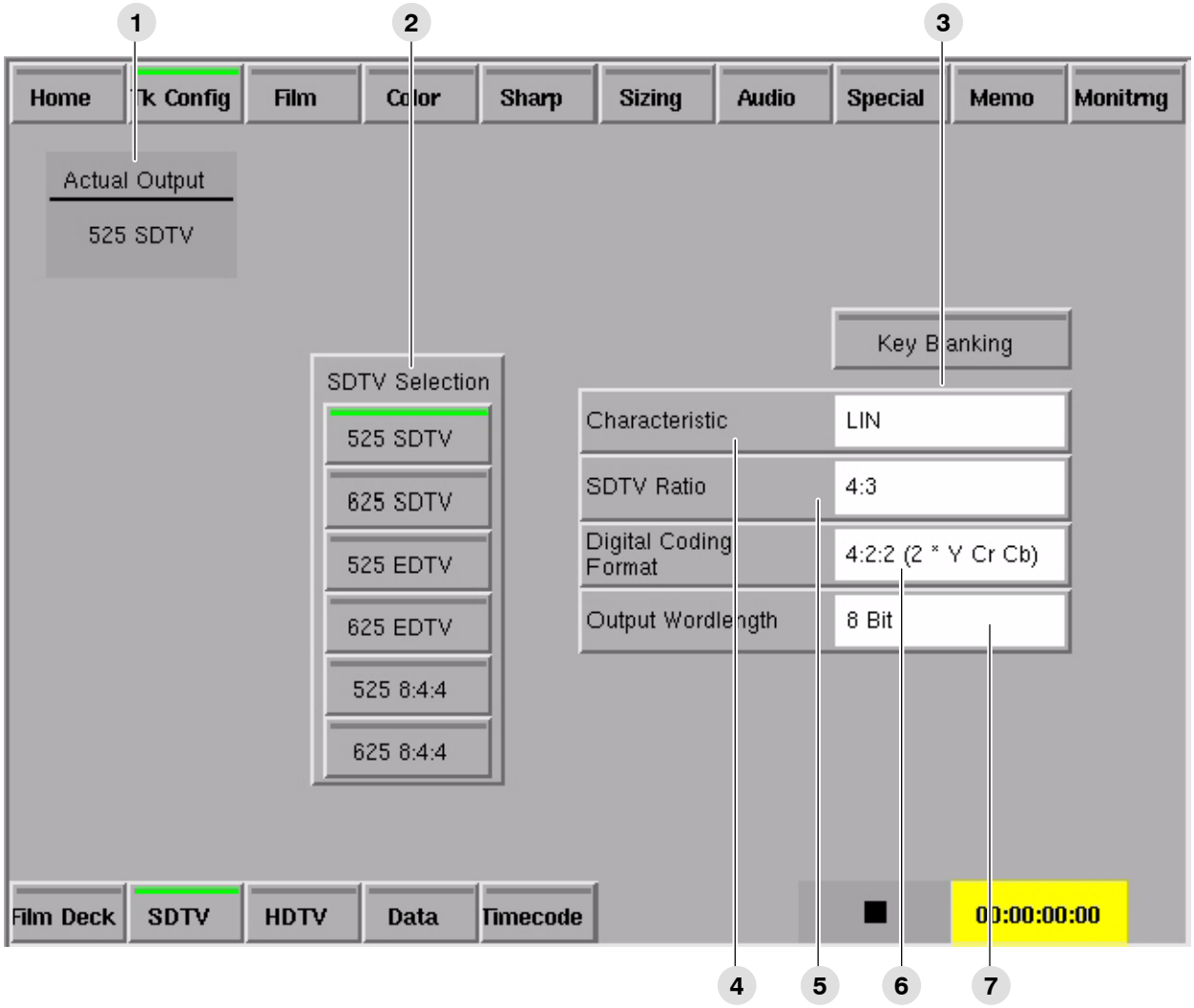


Fig. 307: Main menu **“Tk Config”** / submenu **“SDTV”**

The submenu **“SDTV”** serves to perform video basic adjustments for SDTV outputs.

1 **Actual Output**

The display shows the actual output SDTV standard.

2 **SDTV Selection**

With these function buttons the following SDTV standards can be selected:

525_SDTV	SDTV standard with 525 lines / 60 Hz
625_SDTV	SDTV standard with 625 lines / 50 Hz
525_EDTV	EDTV standard with 525 lines / 60 Hz
625_EDTV	EDTV standard with 625 lines / 50 Hz
525_8:4:4	8:4:4 standard with 525 lines / 60 Hz
625_8:4:4	8:4:4 standard with 625 lines / 50 Hz

3 **Key Blanking**

With this function button (in SDTV OUTPUT only) the key blanking can be switched ON or OFF.

Default selection: **OFF**

4 **Characteristic**

Selection of the picture characteristic for the SDTV output.
Selection:
”LIN”
”CPD”
“CRT”

5 **SDTV Ratio**

Picture aspect ratio for the TV output picture.
Selection:

”4 : 3”	4:3 output picture (default selection)
”16 : 9”	16:9 output picture

6 **Digital Coding Format**

This pull down menu serves to switch the 4:2:2, 4:2:2:4, 4:4:4:4, GBR KBR or the GR KB mode on.

Selection: **4:2:2** / 4:2:2:4 / 4:4:4:4 / GBR KBR / GR KB

”4:2:2 (2* YCrCb)”	4:2:2 mode switched on Link A: Y, C_B, C_R Link B: Y, C_B, C_R Luminance with halfband filtered chrominance according to CCIR 601/656

”4:2:2:4 (Y Cb Cr/K)”
4:2:2:4 mode switched on
Link A: Y, C_B, C_R
Link B: K, 0, 0
Link A: Luminance with halfband filtered chrominance according to CCIR 601/656
Link B: with Key, Chrominance off

”4:4:4:4 (Y/K Cb Cr)”
4:4:4:4 mode switched on
Link A: Y, C_{B0}, C_{R0}
Link B: K, C_{B1}, C_{R1}
Link A: Luminance and even unfiltered chrominance
Link B: Key and odd unfiltered chrominance

”4:4:4:4 (GBR KBR)”
GBR KBR mode switched on
Link A: G, B_0, R_0
Link B: K, B_1, R_1
Link A: Green and even unfiltered blue and red
Link B: Key and odd unfiltered blue and red

7 Output Word Length

This pull down menu serves to switch the wordlength in the digital output signal from 8 to 10 bits.

Default selection: **8 Bit** / 10 Bit

3.3.3 SUBMENU “HDTV”

[The following section is intended for SDC 4000 / SDC 2048 DataCine only!]

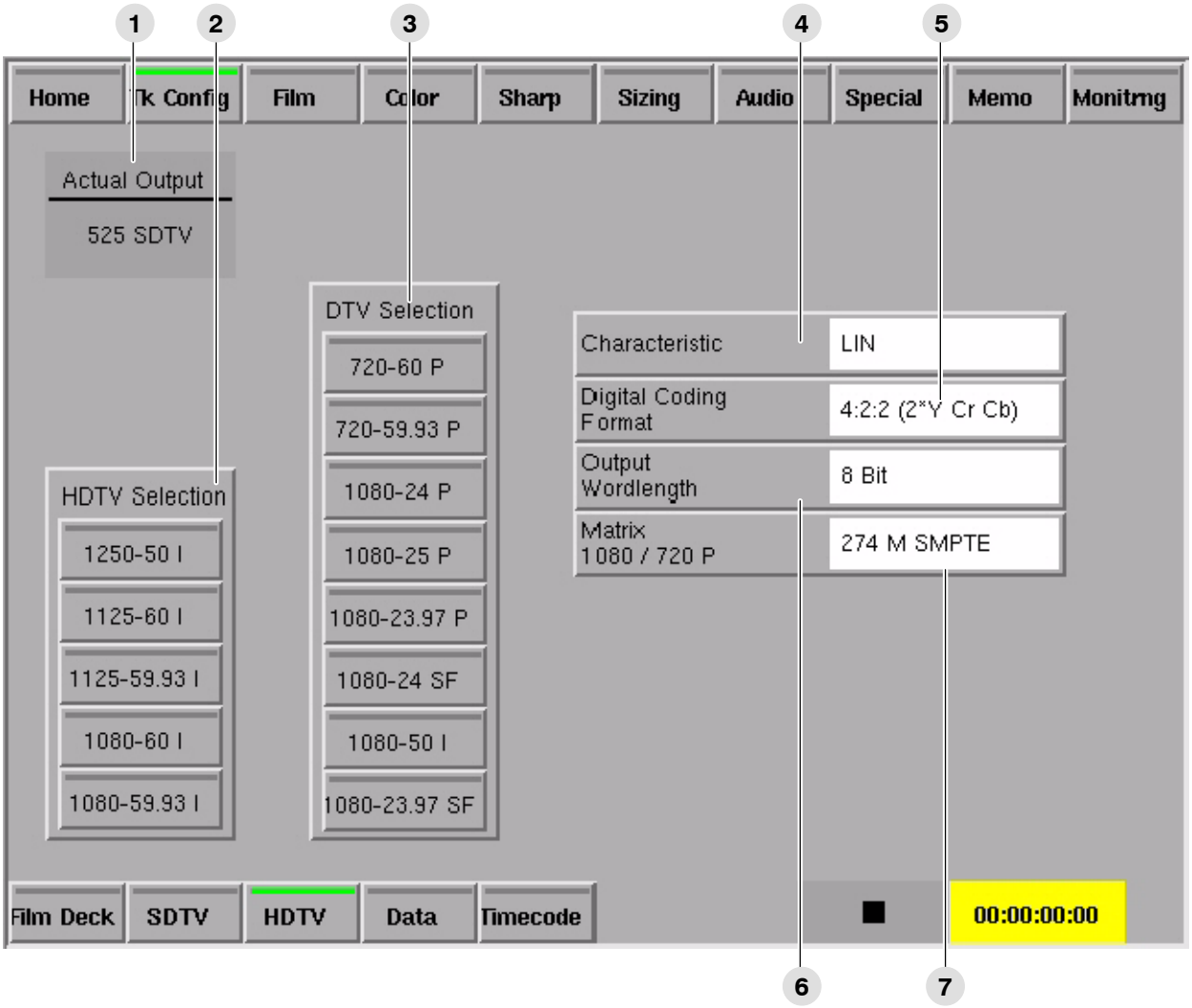


Fig. 308: Main menu **“Tk Config”** / submenu **“HDTV”**

The submenu **“HDTV”** serves to perform video basic adjustments for HDTV and DTV outputs:

1 **Actual Output**

The display shows the actual output HDTV or DTV standard.

2 **HDTV Selection**

With these function buttons the following **HDTV** standards can be selected:

1250_50	HDTV standard with 1152 active lines / 50 Hz
1125_60	HDTV standard with 1035 active lines / 60 Hz
1125_59.93	HDTV standard with 1035 active lines / 59.93 Hz
1080_60	HDTV standard with 1080 active lines / 60 Hz
1080_59.93	HDTV standard with 1080 active lines / 59.93 Hz

3 **DTV Selection**

With these function buttons the following **DTV** standards can be selected:

720_60	DTV standard with 720 active lines / 60 Hz
720_59.93	DTV standard with 720 active lines / 59.93 Hz
1080_24 P	DTV standard 1920x(1080 active lines) / 24 Hz progr.
1080_25 P	DTV standard 1920x(1080 active lines) / 25 Hz progr.
1080_23.97 P	DTV standard 1920x(1080 active lines) / 23.97 Hz progr.
1080_24 sF	DTV standard 1920x(1080 active lines) / 24 Hz segmented Frame
1080_50 I	DTV standard 1920x(1080 active lines) / 50 Hz interlaced
1080_23.97 sF	DTV standard 1920x(1080 active lines) / 23.97 Hz segmented Frame

4 **Characteristic**

Selection of the picture characteristic for the SDTV output.
Selection:
”LIN”
”CPD”
“CRT”

5 **Digital Coding Format**

This pull down menu serves to switch on the 4:2:2, 4:2:2:4, 4:4:4:4, GBR KBR or the GR KB mode.

Selection: **4:2:2** / 4:2:2:4 / 4:4:4:4 / GBR KBR / GR KB

"4:2:2 (2* YCrCb)" 4:2:2 mode switched on
Link A: Y, C_R, C_B
Link B: Y, C_R, C_B
Luminance with halfband filtered chrominance according to CCIR 601/656

"4:2:2:4 (Y Cr Cb/K)" 4:2:2:4 mode switched on
Link A: Y, C_R, C_B
Link B: K, 0, 0
Link A: Luminance with halfband filtered chrominance according to CCIR 601/656
Link B: with Key, Chrominance off

"4:4:4:4 (Y/K Cr Cb)" 4:4:4:4 mode switched on
Link A: Y, C_{R0}, C_{B0}
Link B: K, C_{R1}, C_{B1}
Link A: Luminance and even unfiltered chrominance
Link B: Key and odd unfiltered chrominance

"4:4:4:4 (GBR KBR)" GBR KBR mode switched on
Link A: G, B_0, R_0
Link B: K, B_1, R_1
Link A: Green and even unfiltered blue and red
Link B: Key and odd unfiltered blue and red

"GRKB" GR KB mode switched on
Link A: G_0, G_1, G_2, G_3, ... / R_0, R_1, R_2, R_3, ...
Link B: K_0, K_1, K_2, K_3, ... / B_0, B_1, B_2, B_3, ...
Link A: all green and than all red signals
Link B: all Key and than all blue signals

6 **Output Word Length**

This pull down menu serves to switch the wordlength in the digital output signal from 8 to 10 bits.

Default selection: **8 Bit** / 10 Bit

7 **Matrix**

R'G'B' to Y'C'$_R$ C'$_B$ matrix coefficients for the HDTV standards 1280*720/60P and 1920*1080/60I can be switched-over between SMPTE **240M** and SMPTE 274 / 296M

"274M" coefficients according to SMPTE 274 and 296M

"240M" coefficients according to SEMPTE 240M

3.3.4 SUBMENU “DATA”

The submenu **“Data”** allows the film scanner to be set up for Data Output Mode. The function is supported with option GSN Phantom Transfer Engine.

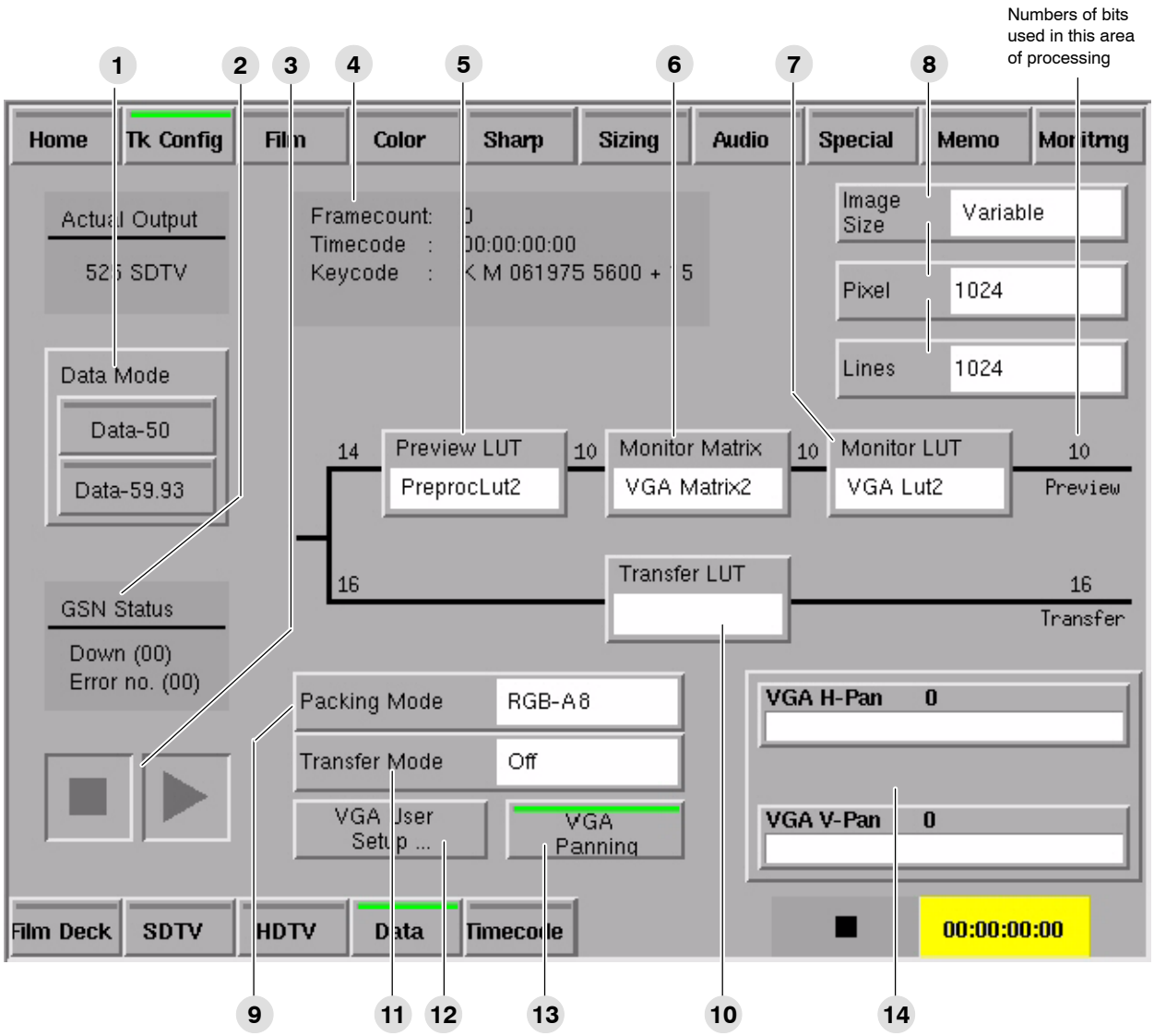


Fig. 309: Main menu **“Tk Config”** / submenu **“Data”**

3.3.4.1 Overview

1 Data Mode

With function buttons **"Data Mode"** the following standards can be selected:

"Data-50"
Selects Data Mode 50 Hz.

- Time code is generated in 50 Hz Mode (25 frames/s)
- Available fixed speeds are 6.25, 12.5, 18.66, 25, 50

"Data-59.93"
Selects Data Mode 60 Hz

- Time code is generated in 60 Hz Mode (24 frames/s)
- Available fixed speeds are 6, 12, 24, 30, 48

2 GSN Status

The display **"GSN Status"** shows the following possible messages:

"Down 00"	Link state is not yet known, only used at startup
"Down 01"	Link is down
"Down 02"	Link is coming up - checking far end
"Down 03"	Link is waiting for far end to report type
"Up 0a"	Link is up, but connected type is unknown
"Up 0b"	Link is up, loopback plug detected
"Up 0c"	Link is up, direct connected to host
"Up 0d"	Link is up, GSN switch detected
"Ready"	Spirit 4K / 2K and workstation have established a logical connection.
"Trans"	Spirit 4K / 2K is transmitting images to the workstation.
"Error 00"	t.b.d.
"Error 01"	t.b.d.

3 Transfer Start / Stop

The function button **"Transfer Start"** starts the data transfer in the data channel. Operates only in Transfer Mode "Frame by frame".

Note:
In this moment the film scanner must be in the locked play operation, not during run-up time. (Button "Lock" on the Control Panel is lit).

The function button **"Transfer Stop"** stops the data transfer in the data channel. Operates only in Transfer Mode "Frame by frame".

Note:
In this moment the film scanner must also be in synchronal play operation (do not stop before).

4 **Timecode / Keycode Status**

Shows the current timecode and keycode value

5 **Image Size**

This pull down menu serves to select:
"Variable" (variable dimensions**)** to define vertical and horizontal resolution of the data output with:

"Pixel" for the horizontal image size of the data output in **pixels per line**. The actual pixel number is displayed.

"Lines" for the vertical image size of the data output in **lines per image**. The actual line number is displayed.

"4 : 3 SDTV" (fixed dimensions)
to display the horizontal and vertical image size for 4:3 SDTV at the data output. Image size ratio: 720 pixels x 540 lines.

"16 : 9 SDTV" (fixed dimensions**)**
to display the horizontal and vertical image size for 16:9 SDTV at the data output. Image size ratio: 720 pixels x 405 lines.

"16 : 9 HDTV" (fixed dimensions**)**
to display the horizontal and vertical image size for 16:9 HDTV at the data output. Image size ratio: 1920 pixels x 1080 lines.

"1280 x 960" (fixed dimensions)
Image size 1280 pixels x 960 lines. Square pixel scan for 4:3 SXGA monitoring based on 1280 pix.**only**

"1364 x 1024" (fixed dimensions)
Image size 1364 pixels x 1024 lines. Square pixel scan for 4:3 SXGA monitoring based on 1024 pix.

"1828 x 1332" (fixed dimensions)
Image size 1828 pixels x 1332 lines. Academy 35 mm 4-perf scan

"1712 x 1240" (fixed dimensions)
Image size 1712 pixels x 1240 lines. Standard 16mm scan

"1920 x 1440" (fixed dimensions)
Image size 1920 pixels x 1440 lines. 4:3 scan based on HDTV horizontal resolution

"2048 x 1171" (fixed dimensions)
Image size 2048 pixels x 1171 lines. Super 16 mm scan

"2048 x 1240" (fixed dimensions)
Image size 2048 pixels x 1152 lines. Super 16 mm scan

"**2048 x 1556** (fixed dimensions)
Image size ratio 2048 pixels x 1556 lines. Full Aperture 35 mm 4-perf scan

"**4096 x 2342** (fixed dimensions)
Image size ratio 4096 pixels x 2342 lines.

“4**096 x 3082** (fixed dimensions)
Image size ratio 4096 pixels x 3082 lines.

“VGA Resolution”
Image size equivalent to the selected VGA resolution

General Descriptin of Lookup Tables (LUTs):
Lookup Tables are used to map signal levels to the required level, range and input characteristics of different downstream products and applications.They are basically tables containing code values. These do not necessarily describe a simple mathematical function, but are rather results of subjective tests and research. Therefore, it is very important to understand how these lookup tables work in order to preserve the required image information.
Lookup tables can be applied at the output and / or input of many products and software applications.
It is essential to take the time and effort to analyze and test the entire chain to find out the best lookup table combinations and setups for each application.

Within the preview signal path the graphics display can be adjusted to the individual requirements by loading user defined LUTs into this area (e.g. for calibration special Print film or projector simulation ...). Individual characteristic in R, G, and B as well as linear RGB matrixing can be applied to the preview monitoring output.

The processing at the preview monitoring output is split into three processing blocks: Preview LUT, Monitor Matrix and Monitor LUT (see Fig. 310:).

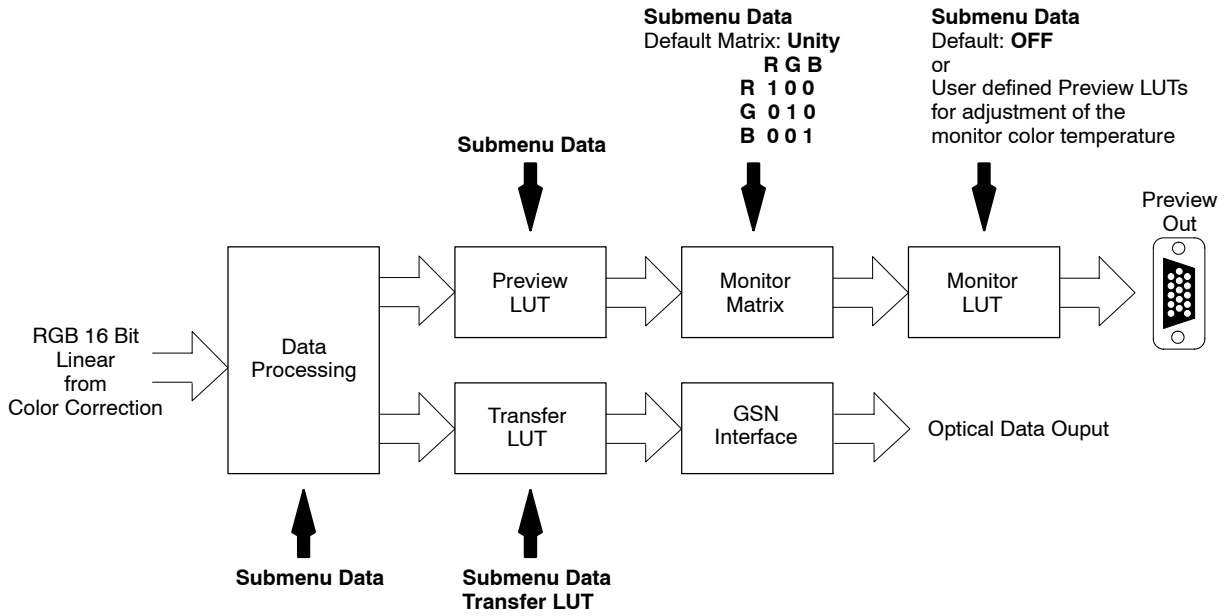
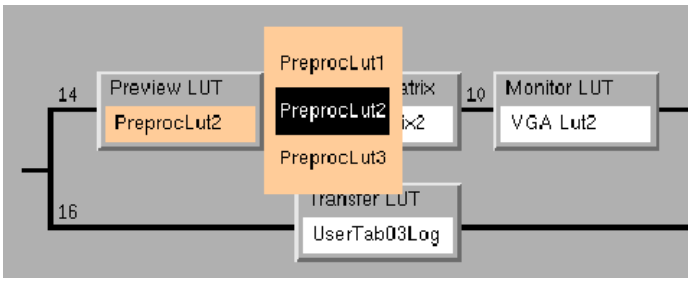


Fig. 310: Overview of Transfer LUT, Preview LUT and respective Controls

6 **Preview LUT**

Conversion LUT from 14bit to 10bit. This LUT should be used if a special transfer curve (like CRT-Gamma) is applied to the image.
There are 4 predefined LUTs available:



LIN 1:1
CRT TV-Level
CRTGR-Level
CPD

Up to 15 additional Tables can be downloaded to the Spirit 4K / 2K file system. See chapter xx. generating of Tables

The handling of the User Preview LUTs is similar to the handling of the existing User LUTs for the main data path.

7 **Monitor Matrix**

The "Monitor Matrix" allows the adaptation of different monitors or monitor technologies (TFT, CRT) via tables.

R/G/B in * C1/9 = R/G/B out, represents the matrix equation

$$\begin{pmatrix} C1 & C2 & C3 \\ C4 & C5 & C6 \\ C7 & C8 & C9 \end{pmatrix} * \begin{pmatrix} R\ in \\ G\ in \\ B\ in \end{pmatrix} = \begin{pmatrix} R\ out \\ G\ out \\ B\ out \end{pmatrix}$$

See chapter 3.3.5.5. Table Generating.

8 **Monitor LUT**

Adaptation LUT 10bit to 10bit. The "Monitor LUT" allows together with the "Monitor Matrix" an individual setup for different monitors or monitor technologies. The nature of a 10bit to 10bit conversion implies that only slight corrections can be applied to the signal.

See chapter 3.3.5.5. Table Generating.

For instructions relating the color adaptation of the VGA Monitor or Graphics Display, refer to the documentation of the respective manufacturer.

9 **Packing Mode**

Convert 16 Bit RGB image data into other formats and resolutions.

RGBA-8 **3** component data words + Alpha set to “0” with 8 bit resolution each are put together to a 32 bit data word (e.g.: R, G, B, 0).

RGB-10 3 component data words with 10 bit resolution each are put together to a 32 bit data word with padding at bits 0 and 1 (e.g.: R, G, B).

Y-10 3 luminance data words with 10 bit resolution each are put together to a 32 bit data word with padding at bits 30 and 31 (e.g.: Y1, Y2, Y3).

RGB-8 3 component data words with 8 Bit resolution RGB

SPIRIT 4K

The following modes are available in Spirit 4K only:

Y-16 luminance data words with 16 bit resolution each

RGB-16 3 component data words with 16 Bit resolution RGB

10 **Transfer LUT**

Transfer LUT 16bit to 16bit. This LUT should be used if a a special transfer curve is applied to the image.

There are 4 predefined LUTs available:

LIN 1:1
CRT TV-Level
CRT GR-Level
CPD

Up to 15 additional tables can be downloaded to the Spirit 4K / 2K file system.

See chapter 3.3.5.5. Table Generating.

11 **Transfer Mode**

Defines the transfer mode.

Selection: **Off** / frame by frame / display changed mode / continuous

"Off" No data transfer.

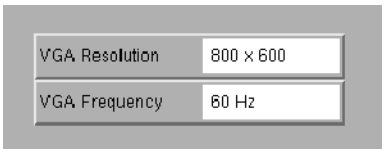
"Frame by Frame" **Only during PLAY** the data transfer begins by pressing transfer START and ends by pressing F2 transfer STOP. Scanned images are transferred proportionally to the film speed. Each frame is transferred **only once**.
The transmission is interrupted by STOP, if the external receiver is not fast enough.
This mode ensures that no image is missing in the transferred sequence.
Application:
Transferring and storing of **complete** sequences.

"Display changed mode" Data is transferred only if the film frame number or the image contents has changed.
The transmission **skips images**, if the external receiver is not fast enough.
Works in all operating modes (shuttle, step and so on).
Application: Preview purposes

"Continuous" Continuous data transfer, independent of the film run status (test mode).

12 **VGA User Setup**

Pressing the button "VGA Setup" opens the following dialog window:



This window serves to set the **VGA Resolution** and **VGA V-frequency**.

Selections:

VGA Resolution: 640 x 480
800 x 600
1024 x 768
1280 x 1024

VGA Frequency: 60 Hz
75 Hz

12 **VGA Panning**

Selection: **Off** / On

"Off" By means of pixel and line dropping, the scanned image is completely displayed on the VGA Monitor.

"On" All scanned pixels and lines can be displayed on the VGA Monitor in a 1:1 display mode.

13 **VGA H/V-Pan**

If the scanned image is larger then the VGA monitor resolution the **VGA H-Pan** and **VGA V-Pan** allow to pan within the scanned image.

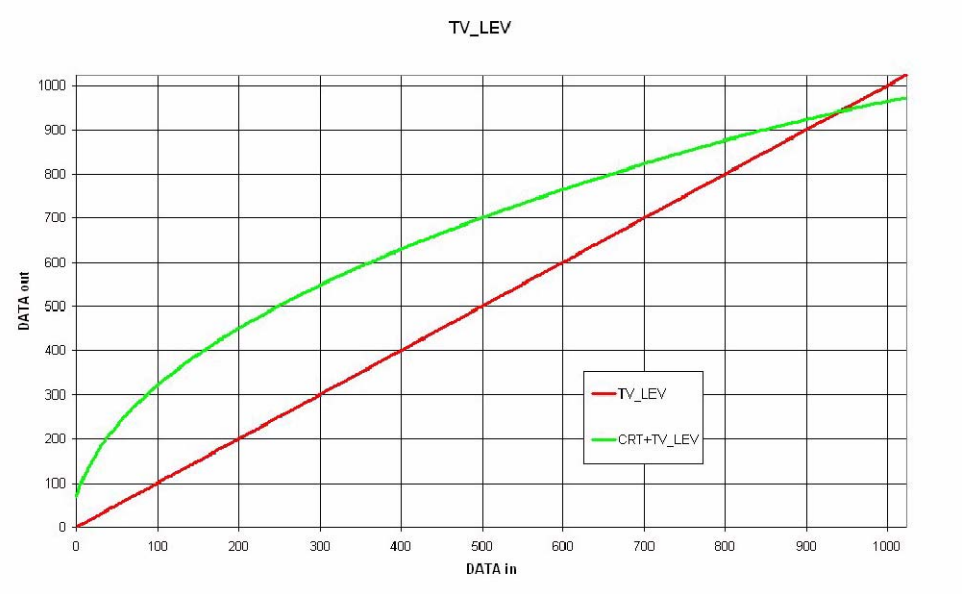
VGA H-Pan horizontal shift range of the VGA image in lines
VGA V-Pan vertical shift range of the VGA image in lines

3.3.5 DESCRIPTION OF LOOKUP TABLES

3.3.5.1 Lookup Table “LIN 1:1” and “CRT TV-LEVEL”

Image data maintains the TV video levels:
Black level $64_{d\ (10\ bit)}$
White level $940_{d\ (10\ bit)}$
High lights up to $1019_{d\ (10\ bit)}$

Characteristics:



Description:
This lookup table maps the image data according to standard video levels (reference black and white) and provides highlight range beyond the reference levels.

This is the easiest way to transfer film content into data, as specially calibrated monitors are not required on the downstream workstations. Most applications can import data mapped to standard video level and visualize it correctly.

This transfer mode with **“CRT TV-LEVEL”** is the best choice if final grading will be performed on Specter Virtual DataCine.

To set up the telecine for transfers in this mode the colorist works the familiar way:

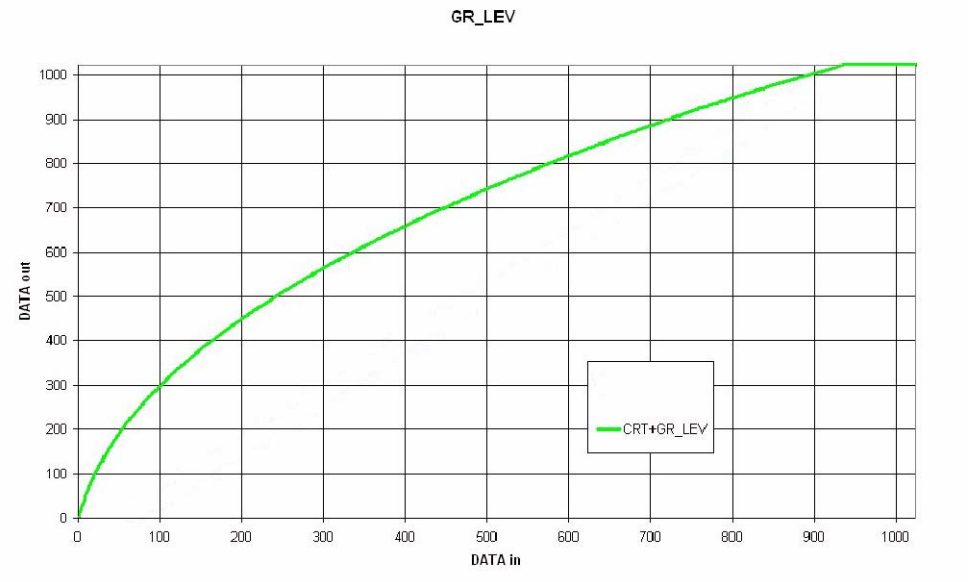
With the monitoring set to the output stage while still in video mode, it is worth noting that 0% (black) on the waveform monitor will be mapped to 64_d, and 100% (white) will be mapped to 940_d when the image data is transferred. For any signal peaks above 100% there is a little headroom up to 1019d. The values between the black and white reference levels will be represented with a linear or CRT characteristic.

3.3.5.2 Lookup Table “CRT GR-LEVEL”

Image data is mapped to graphic video levels

Black level	0_d
White level	$1019_{d\ (10\ bit)}$
within a total range of	$0 - 1023_{d\ (10\ bit)}$

Characteristics:



Description:
Graphics level behaves the same way as **“CRT TV-LEVEL”**, the only difference is the data mapping within the 10-bit range. Looking at the output test point, 0% signal will be mapped to 0_d, 100% to 1019d. There is no headroom for signal portions above 100%.

In the past, traditional graphics workstations for print media (i.e. desktop publishing) usually worked in graphics level, they did not spend bits for headroom, which originates out of the video domain.
Only video oriented applications reserve some code values to provide headroom within their 8 or 10-bit environment to ensure that no picture information is clipped.

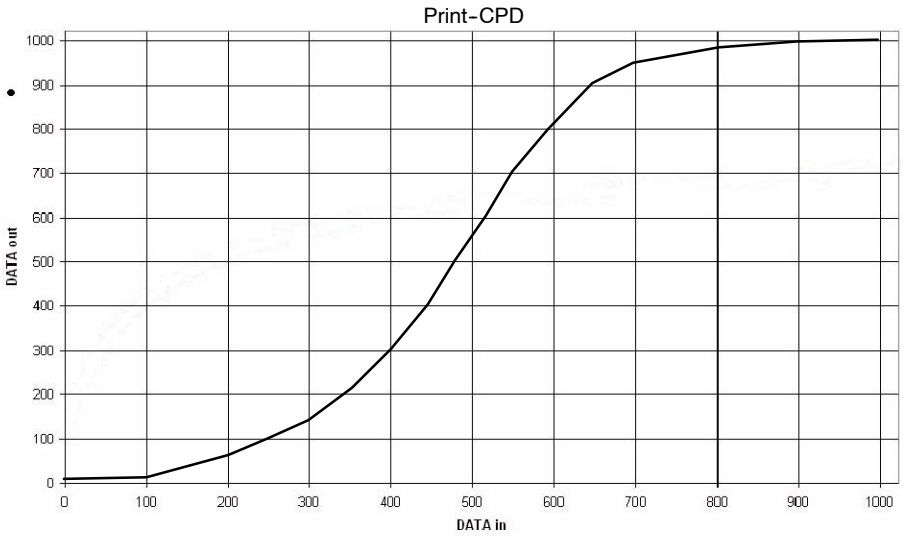
Attention!
Many applications handle TV level and Graphics level data differently, therefore it is important to switch the application to the right mode in order to receive the data appropriately.
If you are working in the wrong way at this point, you will compress the data or cut off high and low lights. The compression can be handled by the downstream application in most cases by setting the data to a higher contrast, but is not recommended for quality reasons.

Note!
The cutoff of information (data from telecine in graphics level, downstream application in TV level mode) cannot be restored.

3.3.5.3 Lookup Table “Print-CPD”

Note: For future use, TV output required!

Characteristics:



Description:
The Print-CPD Lookup Table maps a logarithmic CPD output signal to the code value for a standard CRT monitor. This should a result in comparable colors between the colors of the CRT and a Kodak print film generated from these logarithmic CPD data.

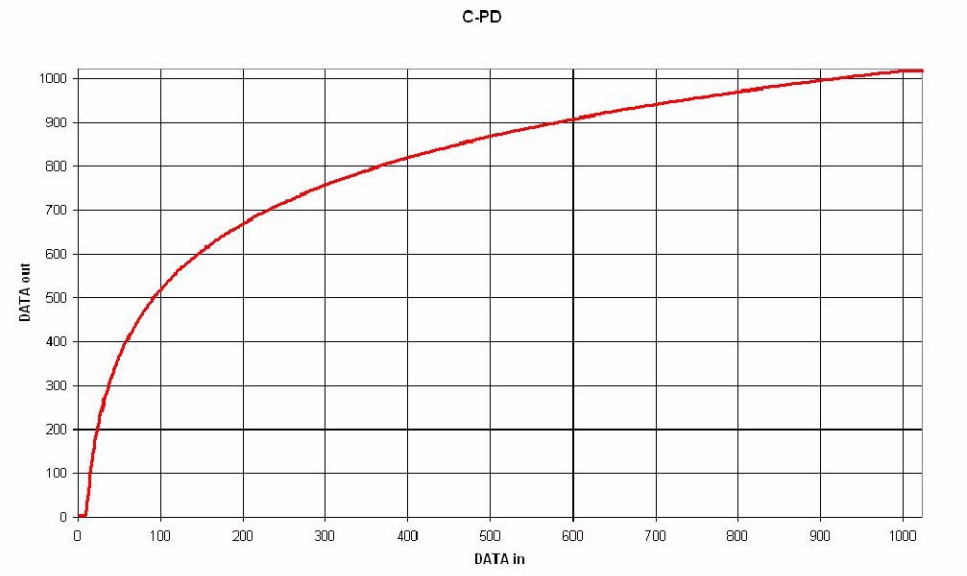
3.3.5.4 Lookup Table "C-PD"

C-PD = Cineon Print Density

This logarithmic characteristic is close to the mathematical Printing Density characteristic. The density range is from 0 to 2.0.

Black level	95_d (10 bit) (3.5% / 24.5 mV)
White level	685_d (10 bit) (71% / 497 mV)
Highlights	up to 1019_d

Characteristics:



Description:
With the C-PD LUT, the film information will be transferred into a DPX Cineon file containing the black and white information as other logarithmic transfers, but highlight information is covered up to code value 1019_d.

To set up the telecine for C-PD LUT, you can either use the original film material if you have an indication of reference black and white (90% reflectance) or take a TAF film printed on the same material.

The figure below shows a typical data transfer application with “C-PD” data conversion mode.

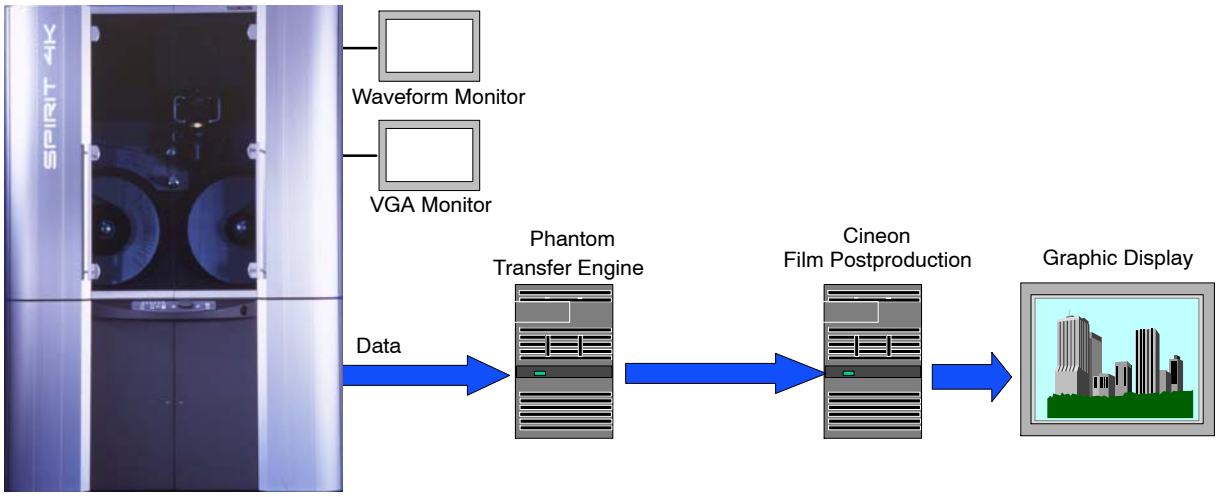


Fig. 311: C-PD Characteristic

Connect a waveform monitor to the monitoring outputs of Spirit 4K / 2K Film Scanner - Rack 2

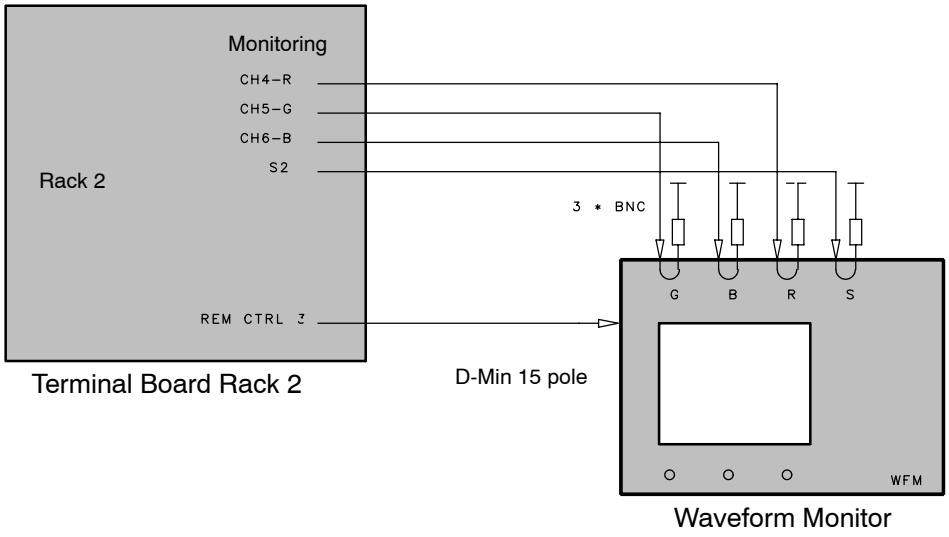


Fig. 312: Connecting a Waveform Monitor

Setup Procedure:
The following procedure is recommended for logarithmically or Cineon calibrated Monitors. For an **One-Light** transfer of **OCN** material, the following settings are recommended.

1. Set Data Mode and LUT:
   Select main menu "**TK Config**", submenu "Data"
   Set the film scanner to Data mode 50 or 59.93
   Select **CPD** LUT in transfer and preview path.

2. Set Film Type to **"Color Negative"** - main menu **"Film"**, submenu **"Matching"**
3. Set primary color correction (Grading) to **"unity - this page"** - main menu **"Color"**, submenu **"Primary".**
4. Set the testpoint selector to testpoint **"AIH/FPN"** - main menu **"Monitoring"**, submenu **"Test Pnt".**
5. Set illumination:
   Select main menu "**Film**", submenu "**Matching**".
   Select "Play" mode with running NEG film.
   Adjust the minimum density (white field, e.g. frame bar) of the NEG film to ≦ 100%. Use Light control!

   Note!
   The scanned image signal of the negative film is not inverted at testpoint AIH/FPN, that means the frame bar produces peak white (D_{min})!

   Adjust Light (illumination) until the signal level on the wave form monitor does not exceed 100 %. If the peak signal values differ very much, film type **"Intermediate Neg"** may give a better match.
6. Select Testpoints:
   Select main menu **"Monitoring"**, submenu **"Test Pnt"**
   Set the testpoint selector to testpoint "Film Color Correction / Mask CRT-Gamma".
   Note!
   From this testpoint, the video signal of the Neg Film is inverted and produces black at the frame bar.
7. For logarithmic calibrated Monitors:
   Set Matching as followed for **all three channels:**
   496 mV at WFM for white (use R - G - B - Gain controls)
   23 mV at WFM for black (use R - G - B - Lift controls)

   Repeat Gain and Lift adjustments until the levels for reference white and black are reached at the same time.
8. For Cineon calibrated Monitors:
   Set Matching as follows for **the channel with the largest dynamic range**.
   496 mV for white (use Gain controls)
   23 mV for black (use Lift controls)
   Set the other two channels to the matching lift control value of the channel above, independent of the level values of the WFM.
   Adjust the black level of these two channels with "Matching Gain" to 23mV at WFM.

3.3.5.5 Table Generating

Generate one or more lookup tables in ASCII text format:

The lookup-tables must be generated in a pre-defined text format. This can be done either using a standard ASCII text editor or using a standard spreadsheet application like Microsoft Excel.

Using a Text Editor:

Open a new text document and enter the decimal values for the red, green and blue channel in the following format:

[0...1023][TAB] [0...1023][TAB] [0...1023][CR][LF]
[0...1023][TAB] [0...1023][TAB] [0...1023][CR][LF]
[0...1023][TAB] [0...1023][TAB] [0...1023][CR][LF]
..... (1024 times)

A table is built of 1024 (16384, 65536) lines and 3 columns where each entry consists of a decimal number between 0 and 1023 (any 10 Bit value) or 0 and 65535 (any 16bit value). The values in the three columns represent the red, green and blue color intensity for a given input value.

Loading the LUT Tables:

It is intended to load all Matrix and Lut files as "Excel Text Sheet" from a memory stick to the Spirit 4K / 2K file system. During transfer from memory stick the files will be checked for syntax errors.

As the feature described above will be not be implemented before Q1-2005 the following procedure has to be done.

1. The LUT or Matrix tables have to be generated in Excel and stored as "text" format. The columns are separated by a <tab>, the line ends with <CR>,<LF>).

   The following name convention will be used:

xxxx_MTX.txt	is the name for the **MONITOR MATRIX** file.
xxxx_VGA.txt	is the name for the 10bit >10bit **MONITOR LUT** file
xxxx_PRE.txt	is the name for the 14bit > 10bit **PREVIEW LUT** file
xxxxxxxx.txt	is the name for the 16bit > 16bit **TRANSFER LUT** file

   The xxxxx characters will appear as LUT names on the GUI of the control panel.

   The tables have the following structure:

xxxx_MTX.txt	columns:	3
	rows:	3
	value range:	-1,9990 .... +1,999
xxxx_VGA.txt	columns:	3
	rows:	1024
	value range:	00 ... 1023
xxxx_PRE.txt	columns:	3
	rows:	16384
	value range:	00 ... 1023

xxxx.txt	column :	3
	rows:	65536
	value range:	00 ... 65535

2. The files have to be converted with the DOS utility **"AvalLutConverter.exe"** into a binary format.
   A syntax check is done during conversion. The file extension for the new generated files will be **".lut"** .

   The following lines are valid command strings for the utility:

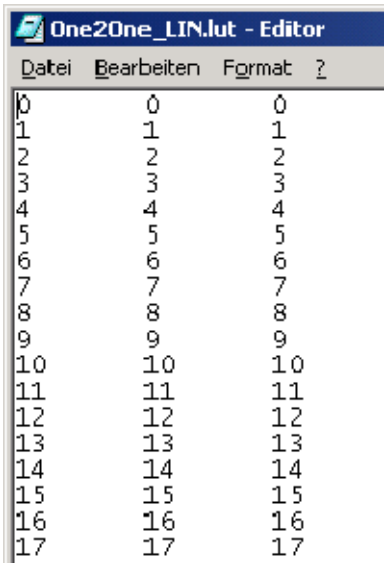
AvalLutConverter.exe main	trans.txt
AvalLutConverter.exe vga	myMoni_VGA.txt
AvalLutConverter.exe pre	myCon_PRE.txt
AvalLutConverter.exe matrix	myvga_MTX.txt

3. The files have to be transferred via FTP to the directory "/**ata0**/**AVDATA**/**LUT**/". The folder should include only **".lut"** files and one **"dir.txt"** file. The **"dir.txt"** file is generated automatically during the boot process and holds all available **".lut"** files. Its format is **"DOS text format"**, each filename in one line with <CR>,<LF> at the end. The contents of the **"dir.txt"** file is exchanged with the control panel so that the LUTs become available as selectors on the GUI.

4. Temporary solution for read from disc update:

   An update of the list on the GCP GUI is done when the button VGA-LUT OFF is switched from OFF to OFF.

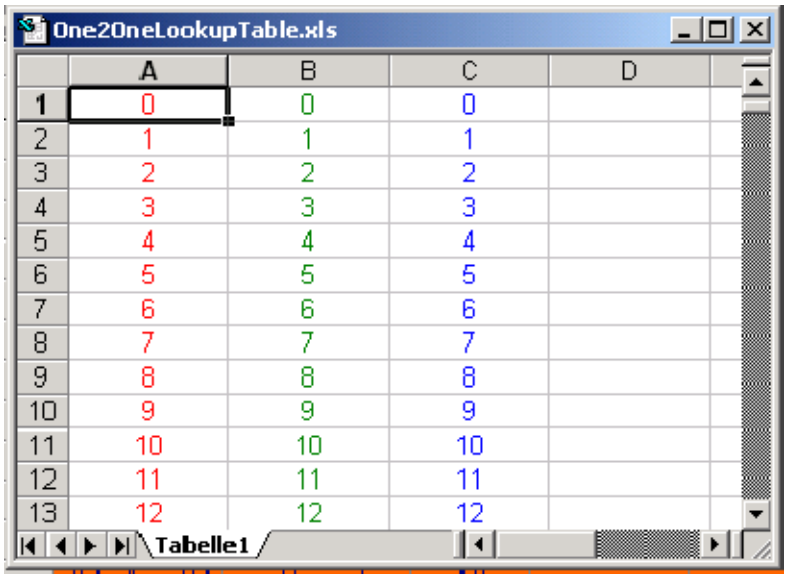
   Example :



Using Microsoft Excel:

Start the spreadsheet application Excel and open a new empty single sheet. Then fill the three columns A, B and C with numbers from 0 to 1023. Do this from row 1 to row 1024. Therefore you can use the automatic increment copy features or a special mathematics formula supported by Excel). To get the text file format from it, export the sheet using the pulldown menu **"Store file as"** and a file-type of **"text with tabs"**. As Excel automatically appends the extension **".txt"** you have to rename the file extension to **".lut"** regarding the naming conventions described in the above chapter.

Example of a one to one lookup-table :



Example of a one to one matrix table :

The range for Matrix values is –1.9999 ... + 1.999

The following example shows the unity matrix. These matrix values do not manipulate the input signal in any way.

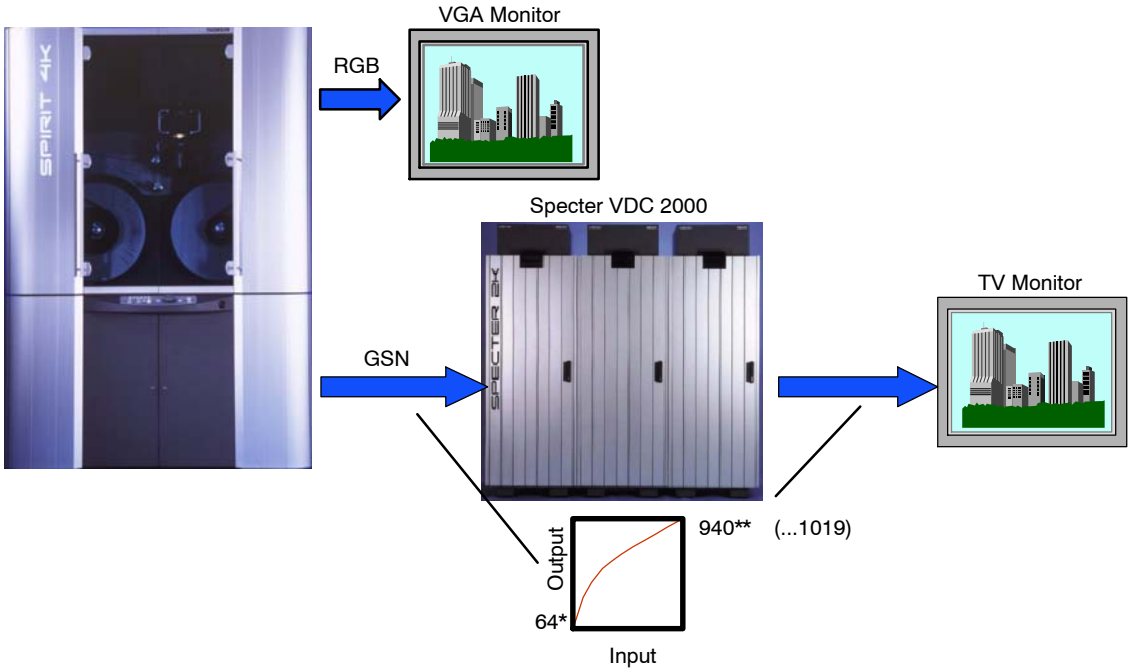
1,0	**0,0**	**0,0**
0,0	**1,0**	**0,0**
0,0	**0,0**	**1,0**

3.3.5.6 Overview of Lookup Tables for Data Applications

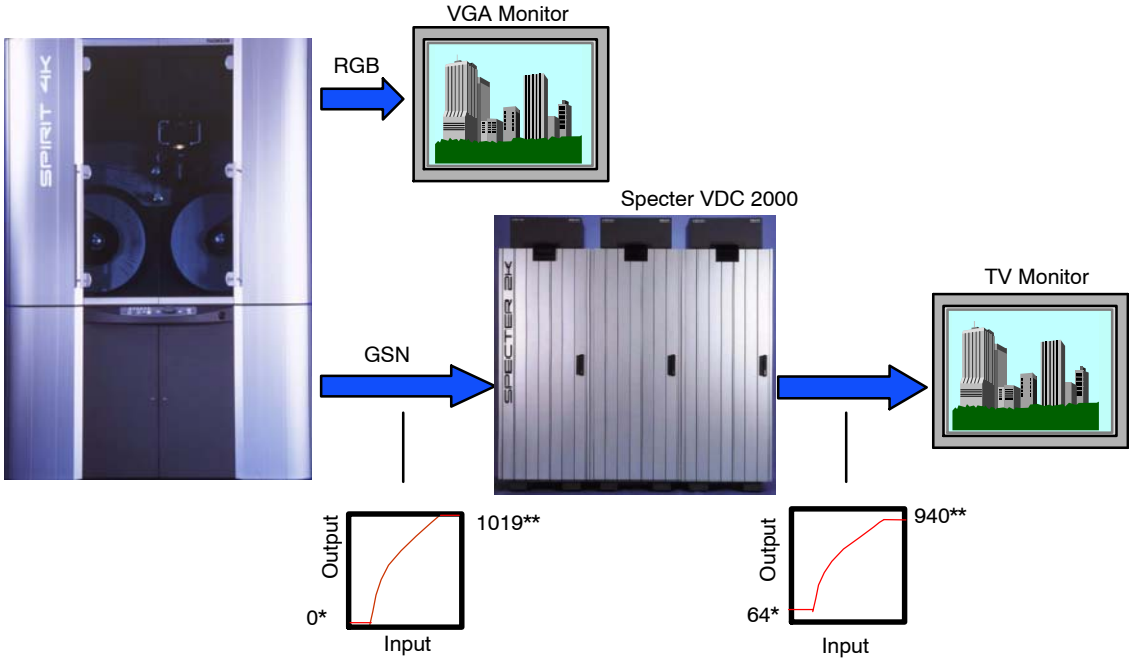
Application	Settings	Characteristics			Workstation Requirements	Comment
		Function	Ref Black (10bit)	Ref White (10bit)		
Grading on a TV Monitor TV => DATA => TV	CRT TV-Level	TV-Gamma	64d	940d	no import or export LUTs ! display gamma = 1 (or fine tuned)	transparent => black and white unclipped
	CRT GR-Level	TV-Gamma	0d	1019d	TV export LUT display gamma = 1 (or fine tuned)	black and white clipped
TV => DATA =>FILM	CRT TV-Level	TV-Gamma	64d	940d	import LUT to 0...1023 and >10 bit linear display gamma to be applied	Workstation clips black and white
	CRT GR-Level	TV-Gamma	0d	1019d	import LUT to >10 bit linear display gamma to be applied	black and white clipped
Grading on a calibrated Graphics Display FILM=>DATA=>FILM	C-PD	Cineon Print D	~ 95d	~ 685d	Cineon import LUT **Logarithmic cal. Monitor**	Cineon Printing Densities - set Data mode first - set C-PD LUT - illumin. signal level ≤ 100% - matching Black 23mV & Gain 496 mV WFM
	C-PD	Cineon Print D	~ 95d	~ 685d	Cineon import LUT **Cineon calibr. Monitor**	see above C-PD comments. Match to channel with largest dynamic range.

3.3.5.7 Function of Lookup Tables for Data Applications / Data for TV

CRT TV-LEVEL Characteristic



CRT GR-LEVEL Characteristic

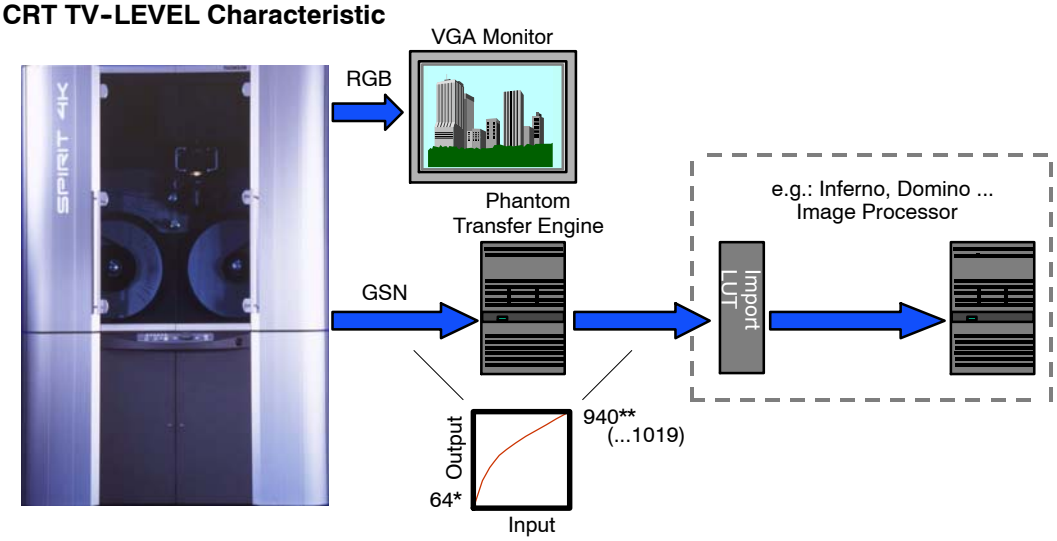


** White reference level : decimal value of a 10 bit system
* Black reference level : decimal value of a 10 bit system

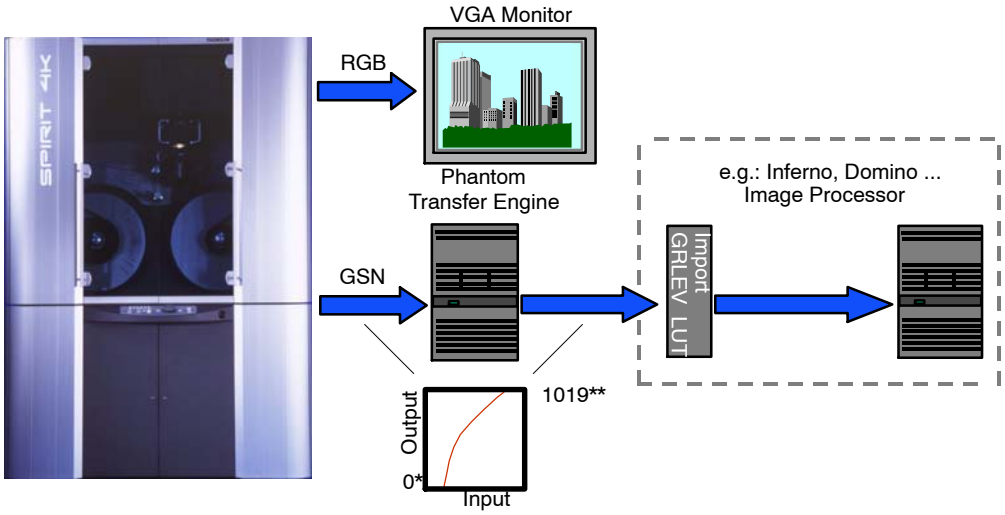
Fig. 313: Data conversion for TV

3.3.5.8 Function of Look-up Tables for Data Applications / Data for Film

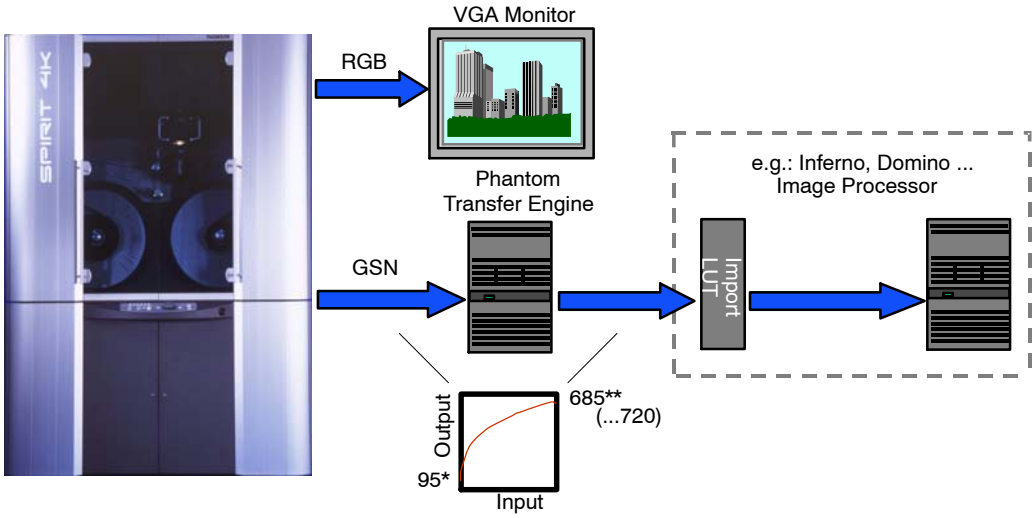
1. CRT TV-LEVEL Characteristic



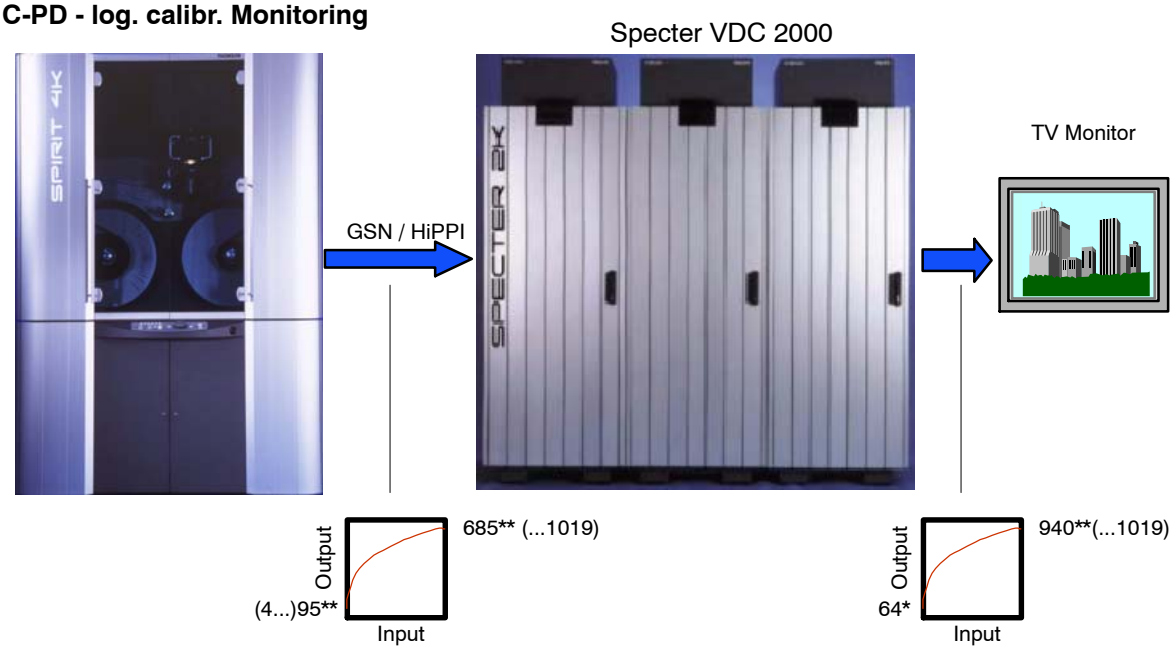
2. CRT GR-LEVEL Characteristic



3. TV-PD Characteristic



4. C-PD - log. calibr. Monitoring



5. C-PD, Cineon calibr. Monitoring

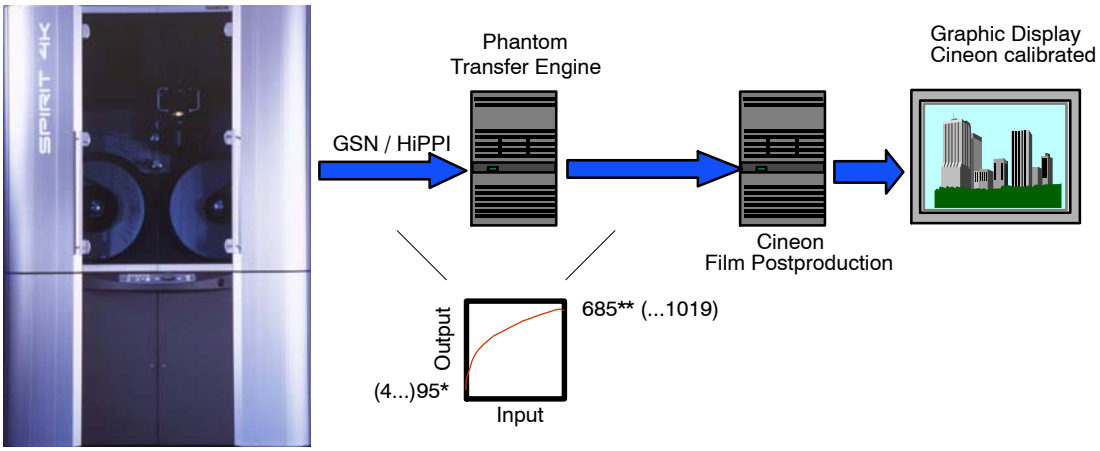


Fig. 314: Data application: Data for Film

3.3.5.9 Data Output / Default Pre-Processing

Output LUT	CRT Gamma	Preview Processing Input	VGA Characteristic		VGA LUT Input	
			GCP Display	*VGA Pre-Processing*	*Char.*	*Level Range*
CTR TV-LEVEL	ON	CRT	CRT	1:1 LUT (TVLEV Output LUT)	CRT	(4…)64*…940**(…1019)
CTR TV-LEVEL	OFF	LIN	LIN	1:1 LUT (TVLEV Output LUT)	LIN	(4…)64*…940**(…1019)
	OFF	LIN	CRT	CRT LUT	CRT	(4…)64*…940**(…1019)
CRT GR-LEVEL	ON	CRT	CRT	1:1 LUT + Black and white limiter	CRT	64*…940**
CTR GR-LEVEL	OFF	LIN	LIN	1:1 LUT + Black and white limiter	LIN	64*…940**
	OFF	LIN	CRT	Black and white limiter + CRT LUT	CRT	64*…940**
CPD	-	LOG	Flat	1:1 LUT (TVLEV Output LUT)	LOG	(4…)95*…685**(…1019)
	-	LOG	CRT	DELOG+CRT/TVLEV expansion	CRT	(4…)64*…940**(…1019)
	-	LOG	Print-LOG	Print-Look from logarithmic calibrated data for CRT display	CRT	(4…)64*…940**(…1019)
TV-PD	-	CRT	CRT	1:1 LUT (TVLEV Output LUT)	CRT	(4…)64*…940**(…1019)
TV-G	-	CRT	CRT	1:1 LUT (TVLEV Output LUT)	CRT	(4…)64*…940**(…1019)
DXR	-	CRT	Flat	DXR Output LUT	LOG	(66…)95*…685**(…836)
	-	CRT	CRT	Ref. White mapping: 685=>940	CRT	64*…940**(…1019)
DXR-G	-	CRT	Flat	DXR-G Output KUT	LOG	(66…)95*…685**(…836)
LOG	-	LIN	Flat	LOG Output LUT	LOG	(4…)95*…685**(…1019)
	-	LIN	CRT	CRT+Ref. White mapping: 685=>940	CRT	(0…)64*…940**(…1019)
User .LIN	OFF	LIN	LIN	1:1 LUT (TVLEV Output LUT)	LIN	(4…)64*…940**(…1019)
	OFF	LIN	CRT	CRT LUT	CRT	(4…)64*…940**(…1019)
User .CRT	ON	CRT	CRT	1:1 LUT	CRT	(4…)64*…940**(…1019)
User .LOG	-	LOG	Flat	1:1 LUT	LOG	(4…)95*…685**(…1019)
	-	LOG	CRT	DELOG+CRT/TVLEV expansion	CRT	(4…)64*…940**(…1019)

VGA Input values in dependence to Output LUT, CRT Gamma & VGA Characteristic

Note!
** = Black reference level: decimal value of a 10 bit system*
*** = White reference level: decimal value of a 10 bit system*

All VGA Characteristics are designed to be displayed on a CRT monitor connected to "Preview Out".

Please use the VGA Characteristic CRT to set reference black and white on the preview monitor with brightness and contrast controls.

If more than one setting is possible the default is marked yellow.

3.3.6 SUBMENU “TIMECODE”

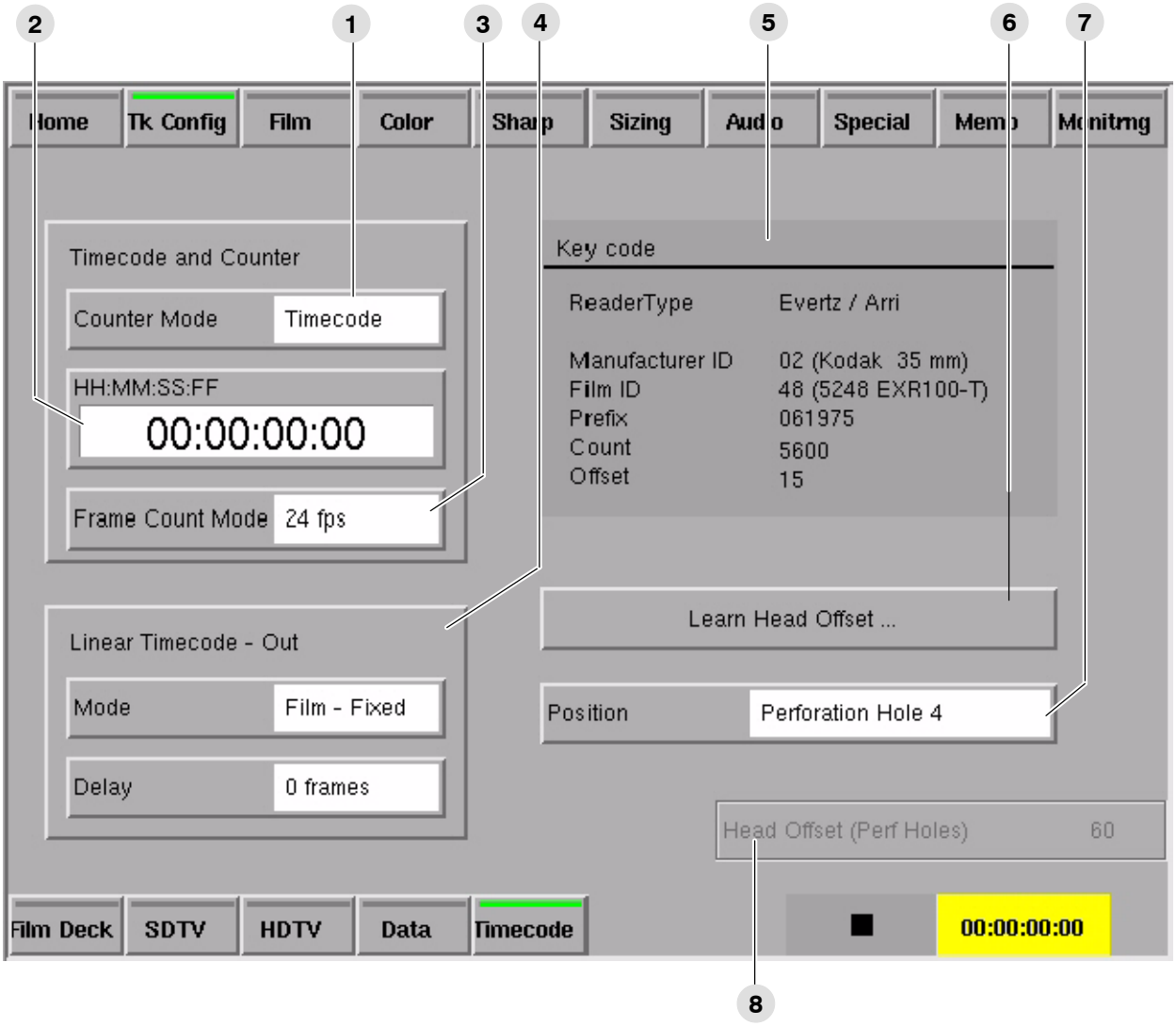


Fig. 315: Main menu **“Tk Config”** / submenu “**Timecode**”

The main menu **“Tk Config”** / submenu **“Timecode”** serves to set the linear time code, to adjust the frame accurate counting of film frames and keycode (4perf 35mm film and 1perf 16mm film).

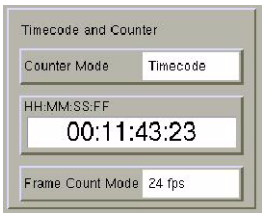
3.3.6.1 Overview

1 **Counterr Mode and Display**

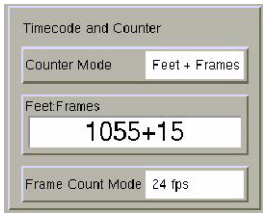
2 Three different modes are selectable: **Timecode, Frames, Feet & Frames.**

The upper line shows the Counter Mode in which the scanner is currently counting.

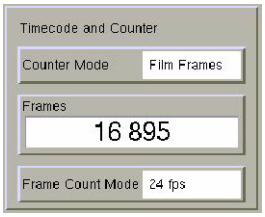
To change this mode, click on the key and make your choice from the drop-down menu.The display shows the current Counter Position of the scanner. The lower line shows the Frame Count Mode depending on the output standard.



Film TC



Keycode value



Film Frames

Counter Setup:
To enter the counter value, touch the display area and use the numeric keyline and the function buttons.

3 **Frame Count Mode**

Selection of the standard-dependent timecode operation mode.

Following frame count modes are selectable:

24 frames:	for 24 frames/sec and 60 or 59.94 Hz video systems
25 frames:	for 25 frames/sec and 50 Hz video systems
30 frames:	for 30 frames/sec and 60 Hz video systems
30 comp.*****:	for 24 frames/sec and 60 or 59,94 Hz video systems

*** Note:**

30 comp. = 30 frames compensated
In 24 fps mode the frames are numbered from 0 to 29, but each fifth digit is dropped:
0, 1, 2, 3, 5, 6, 7, 8,
10, 11, 12, 13, 15, 16, 17, 18,
20, 21, 22, 23, 25, 26, 27, 28,
0, 1, 2, ...

4 LTC Out Mode / Delay

[The following item is intended for SDC 4000 DataCine only!]

Serves to select Linear Timecode operation mode. Linear Timecode should not be mixed up with the Longitudinal Timecode generated in a VTR. One possible application of this feature is the synchronization of external devices, such as DAT or Sepmag Players, it can also be used to feed the external Timecode In of the Recorder VTR or the Phantom Transfer Engine for HD transfers into the SGI HD Input/Output board.With the upper key, Linear Timecode Mode settings can be made. The current mode is displayed on the key.
Three different modes are selectable: Film Fixed, TV-TC Gen and Film Variable. To change this mode, click on the key and make your choice from the drop-down menu.

Mode "TV-TCGen"
In this mode the LTC signal is locked to the TV signal and has to be used when the timecode output of the film scanner is connected to the timecode input of a video tape recorder.
For every video frame, a unique timecode number will be generated.
For 24 fps film speed and 59.94 /60 Hz TV-systems the repeat rate of video fields is taken into account.
This mode can only be used with the following settings:

	TV Standard	Film Speed	Frame Count Mode
1	50Hz	25 fps	25
2	59.9Hz/60Hz **	24 fps	24
3	59.9Hz/60Hz **	30 fps	30
4	24 progressive	24 fps	24
5	59.94Hz/60Hz progressive	24 fs	24 ***

** = non drop frame mode
*** = Two frames are allocated to one time code value

Mode "Film-Fixed"
Operates like mode TV-TCGen, but the frame numbers are always related to film.
Therefore TC numbers with the same value can be transmitted multiple times at slow speeds. Frame numbering is done according the Frame Count Mode setting.

Mode "Film-Variable"
In mode film-variable, the LTC frequency is variable in the range from 12 fps to 57 fps. For every video frame a unique timecode number will be generated.
For all other speeds the FILM-fixed mode will be used automatically.
Frame numbering is done according the Frame Count Mode setting.

Note!
LTC displayed in the TC-field of each main menu is calculated according to the LTC of the Time Code Menu (see also parameter "Frame Count Mode").

Delay
The lower button shows the current delay. Different settings are needed in order to match the Linear Timecode timing with delays introduced by external devices.

The possible selection ranges from 0 to 3 frames.
”0” means no delay active. To change, click on the key and make your choice from the drop–down menu.
Note that the telecine has to be in STOP mode. This function is important for transfers into the SGI HD i/o board.

Following LTC count modes are selectable:

“0” No delay of LTC signal

“1 - 3” 1 - 3 frame(s) delay of LTC signal

Different delays can be selected in order to match the timecode signal with delays introduced by other external devices.
LTC setting can be selected between 0 and 3 frames. The default delay after a power-up is 0 frames. Changing LTC delay is only accepted when the filmdeck is in STOP mode.

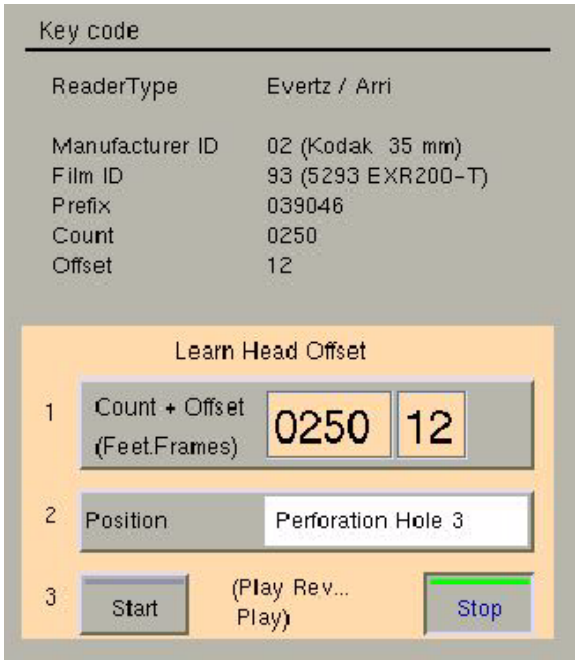
For more details refer section 3.3.6.7 below.

5 **Key Code**

Shows the current Key Code status.

6 **Learn Head Offset**

Pressing button **"Learn Head Offset"** opens this window for Keycode setup.



This window serves to set the keycode parameter "Keycode position" and "Head Offset" via learn mode automatically.

"Count + Offset" serve to set the film length in feet and frames. For setting push the **"Count + Offset"** window. Numerical buttons will appear at the top of the screen. Type the requested values and enter with the Ok-button below.

"Position" serves to sei Keycode position (always perf 1 for 16mm films) and determine the "Zero Frame Reference Mark" at the perforation holes 1 – 4 for 35mm film.

"Start" serves to starts the learn mode for setting the "Head offset" in "perforation holes.

"Stop" serves to stop the learn mode.

7 Set Position of the Perforation Hole. See details in section 3.3.6.3 below.

8 Set Head Offset (Perf Holes). See details in section 3.3.6.3 below.

3.3.6.2 Checking and Operating Keycode Generation

The operating procedure applies to keycode data reproduction including insertion into the ancillary data of the GSN output and into the user bits of the LTC Out and SDTV (Video + VITC only with external equipment!). The data is generated by a keycode reader from the manufacturers EVERTZ or AATON Keylink System V.8.

For details see the system applications in the Planning & Installation Manual.

Preconditions and Restictions:

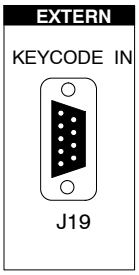
- The system operates only with 3 and 4 perf 35mm and 1 perf 16mm films correct.
- AATON Keylink system V 8.2 or higher is required.
- Evertz Keycode reader models 5500 and 5550 are tested by Thomson.
- 2, 6 and 8 perf film material are not supported from the AATON and EVERTZ keycode readers.
- ARRI keycode reader is not supported!

Notes Concerning Keycode Reader Setup:

The setup procedure for 16mm and 35mm (1, 3, 4 perf) film material is the same.

1. Check the connection from the keycode reader head to the reader device (decoder).

Rack 2



2. Check the connection from the keycode reader device (decoder):

EVERTZ
"Serial I/O" to the keycode reader input of Spirit 4K / 2K Rack 2 - EXTERN KEYCODE IN J19 (9 pin / RS 232).

Cable:

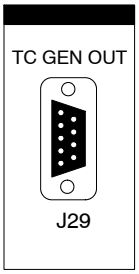
Evertz 5500 / 5550	Spirit 4K / 2K
Sub-D 9 pin (male)	Sub-9 pin (male)
3 ----------	2
2 ----------	3
5 ----------	5 GND

AATON
"Keylink Com 1" to the keycode reader input of SDC 2001 Rack 2 - EXTERN KEYCODE IN J19 (9 pin / RS 232).

Cable 1:

AATON	Spirit 4K
Sub-D 25 pin (male)	Sub-9 pin (male)
3 ----------	2
2 ----------	3
7 ----------	5 GND

Rack 2



Cable 2: (is part of the AATON Keylink System)

Keylink PC "MTC board top socket" to the bi phase sync signal output of Spirit 4K / 2K Rack 2 - TC GEN OUT - J29 Sub-9 pin (male)

3. **Only for AATON Reader!**
   Adjust bi phase pulse to one pulse per frame.

   Select menu "**Special**" - submenu "**Extern D**" (Devices)
   Choose parameter "**TC Generator Out Coupling**" and set to "**1 x BiPhase**"

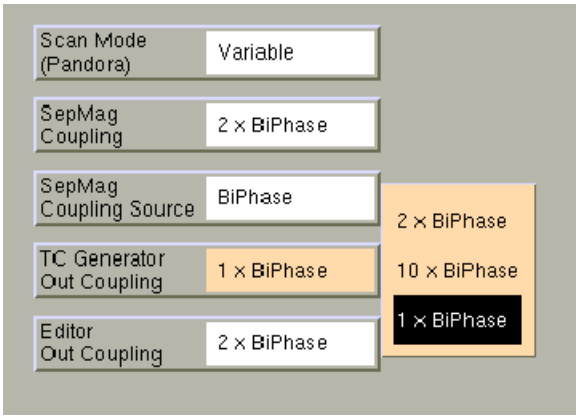
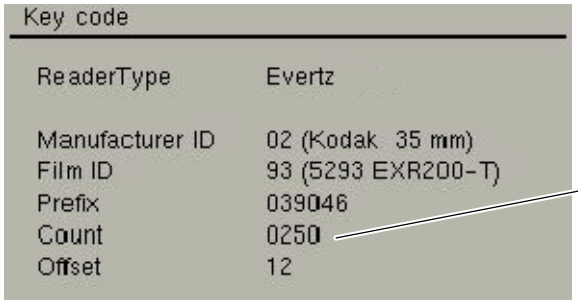


Fig. 316: Main menu **"Special"**, submenu "Extern D"

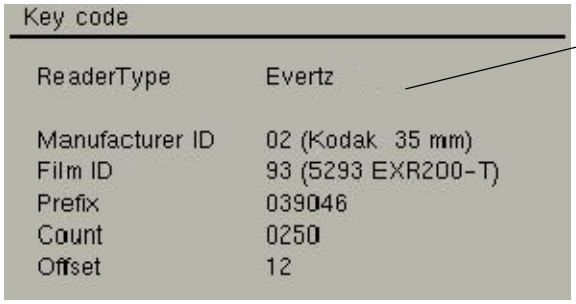
4. Thread a 16mm or 35mm film with keycode.
5. Select PLAY mode
6. Adjust the keycode reader settings (film type, intensity, ...) as described in the keycode reader manual (EVERTZ / AATON).
7. Open the "**Timecode**" menu. The current keycode should be displayed, "**count**" and "**offset**" values should change.



Note!
If question marks are displayed, repeat step 5!

Fig. 317: Window **"Key Code"** section of submenu **"Timecode"**

8. Select STOP mode
9. Open submenu "**Timecode**" window.
   "**Key Code**" setup will be displayed.
   Adjust the reader head offset as described in chapters "Manual Setup" 3.3.6.3 or Learn Mode "Head Offset" 3.3.6.5
10. Check that the correct reader type is displayed in the "Key Code" setup window.
    Reader type: EVERTZ or AATON



Reader Type EVERTZ or AATON is recognized via RS 232 interface. Rack 2 - J19 KEY-CODE IN

Fig. 318: Window **"Key Code"** setup

3.3.6.3 Manual Keycode Setup

1. Set **head offset** in “perforation holes” (default value: 62 for 16mm and 35 mm films); the distance (amount of perforation holes) between reader head and film gate (illumination slit).
   Use the numerical buttons to insert the “head offset” value.
2. Set **keycode position** (always “perf-1” for 16mm films). Determine the “Zero Frame Reference Mark” at the perforation holes 1 - 4, for example perforation hole 3 as shown in the next figure.

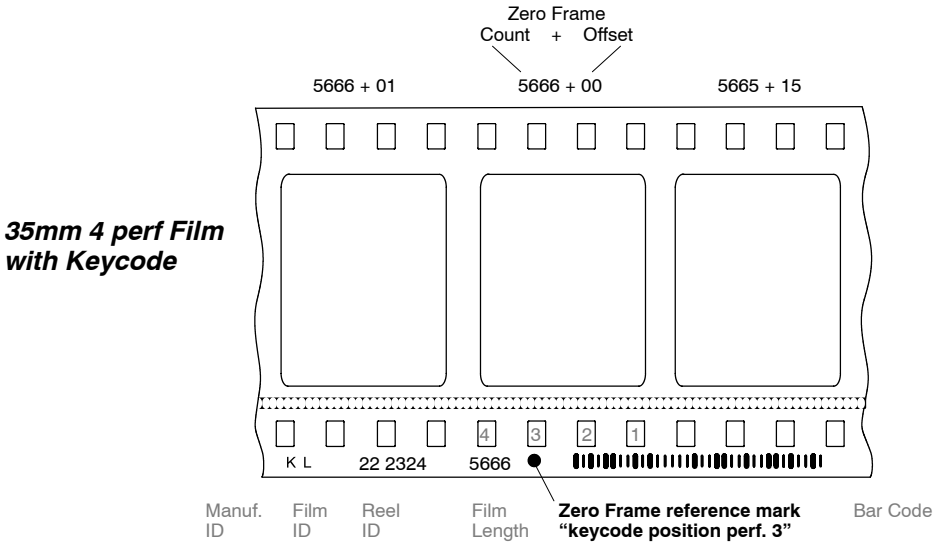


Fig. 319: 35mm 4 perf film with keycode

Keycode position and head offset are set manually!

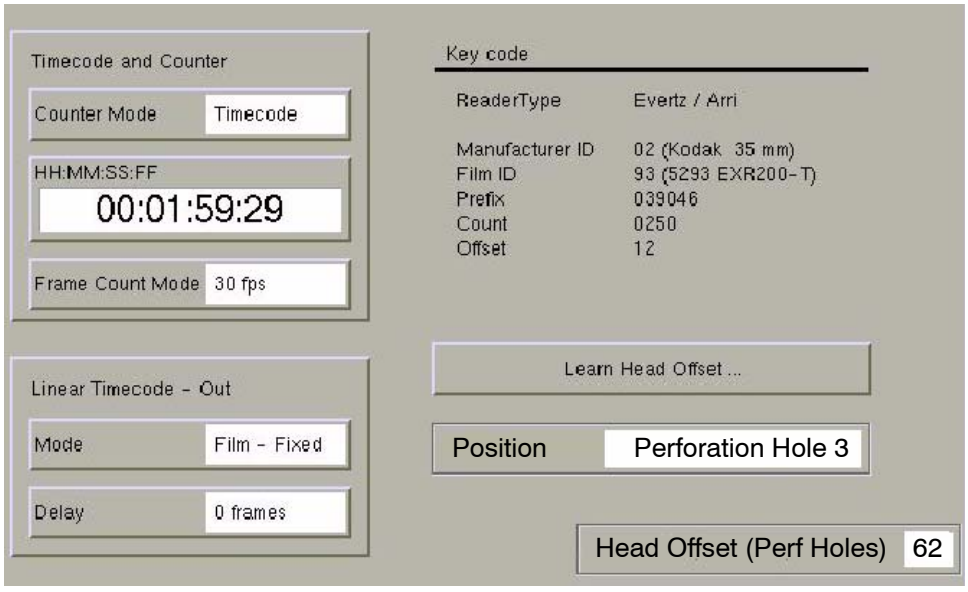


Fig. 320: Main menu **“Tk Config”** / submenu **“Timecode”**

3. Check the Keycode
   Play a short piece of film and take care that any Keycode is read on the reader device and compare the keycode of the currently scanned frame with the displayed code in the submenu “Timecode”.

   Window “Key Code”

   Count: Film length in feet
   Offset: Frame offset (e. g. 0 -15 for 4 perf 35mm film)

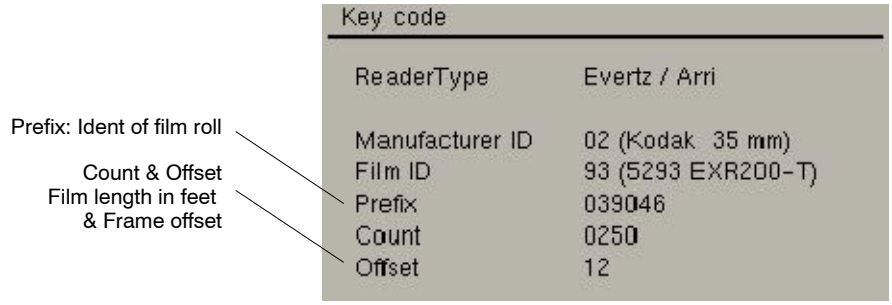


Fig. 321: Submenu **“Timecode”** / window **“Key Code”**

3.3.6.4 Remarks Concerning the Keycode Numbering

Important!
In general the system ensures that the keycode numbering related to the film frames is always correct for the different film perforations (1, 3, 4).

To avoid an ambiguity of the keycode to the film frame the keycode offset is calculated according to “SMPTE Recommended Practice RP 195-1998” as follows:
*Keycode number repetition rate **K** (64 perf) modulo the frame repetition rate **R** (e.g. 4 perf per frame for a 4 perf 35mm film).*

For details, see the table below.

Offset matching for 35mm films

Keycode number repetition rate = 64 perforation holes
(16 frames for 4perf 35 mm film or 21/21/22/21/21/22.. frames for 3perf 35mm film)

Frame Repetition Rate Perf/Frame	**Keycode Count** (in feet)	**Offset** (in frames)
3	xxxx	+00 .... +20 (21 frames) foot 1/2/4/5 +00 .... +21 (22 frames) foot 3/6..
4	xxxx	+00 ... +15 (16 frames)

Defining the first foot of 3 perf films:
The first foot is the foot in which the reference mark appears within the first K-modulo-R perforations.

Example:
In numbering the frames of 35mm **3 perf**, by convention, the first foot and second foot each include 21 frames, numbered +00 through +20, and the third foot includes 22 frames, numbered +00 through +21.
The first foot is the foot in which the reference mark appears at the **first** perforation after the frame line at the start of the foot, as shown below.

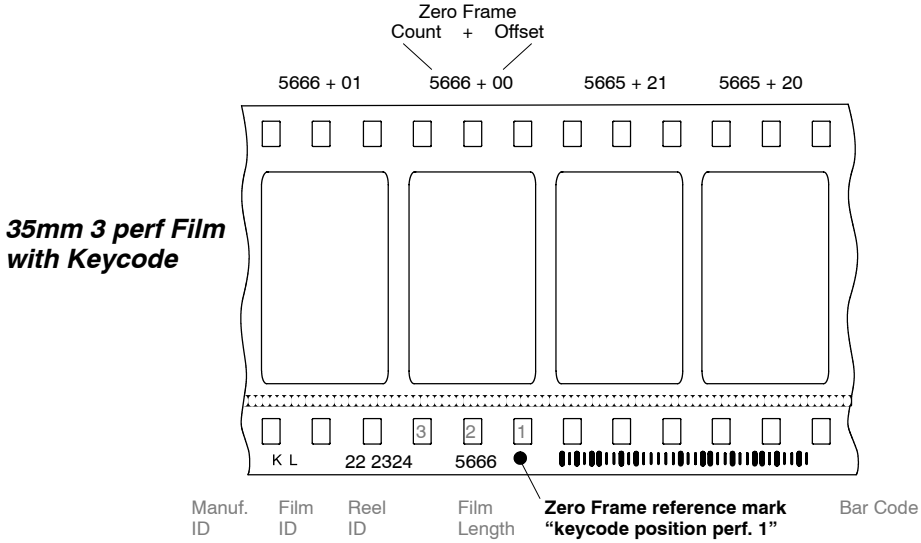


Fig. 322: 35mm 3 perf film with keycode

Offset matching for 16mm films

Keycode number repetition rate = 20 perfs!

Perf/Frame	Keycode Count	Offset
1	xxxx	+00 .... +19 (20 frames)

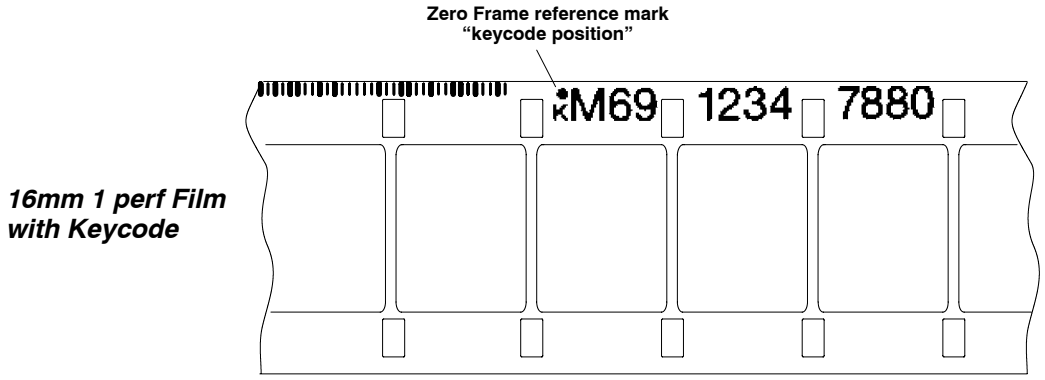


Fig. 323: 16mm 1 perf film with keycode

3.3.6.5 Learn Mode “Head Offset” (Automatically)

1. Mark a reference frame on the film
   and note the respective keycode (count) printed on the film edge and the offset which is the number of frames between the **zero frame** (Count xxxx+ offset 00) and the **marked frame**.

   Example of the marked frame below: Count = 5666 Offset = 01

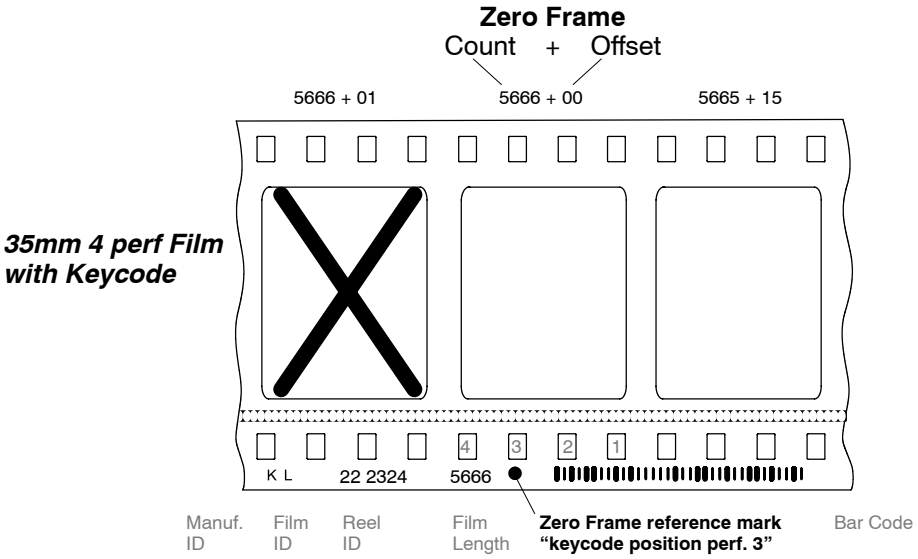


Fig. 324: 35mm 4 perf film with keycode with marked reference frame

2. Park the film at the marked reference frame (Film gate position, illumination slit)

3. Set keycode **Position** (always “perf 1” for 16mm films)
   Determine the perforation hole which is marked with the dot of the “Zero Frame Reference Mark” (for example “perf 3” as shown in figure Fig. 324:).

4. Set **Count + Offset** of the reference frame from step 1
   Submenu “Timecode” / window “Learn Head Offset”.
   Set both with the numeric keyline.

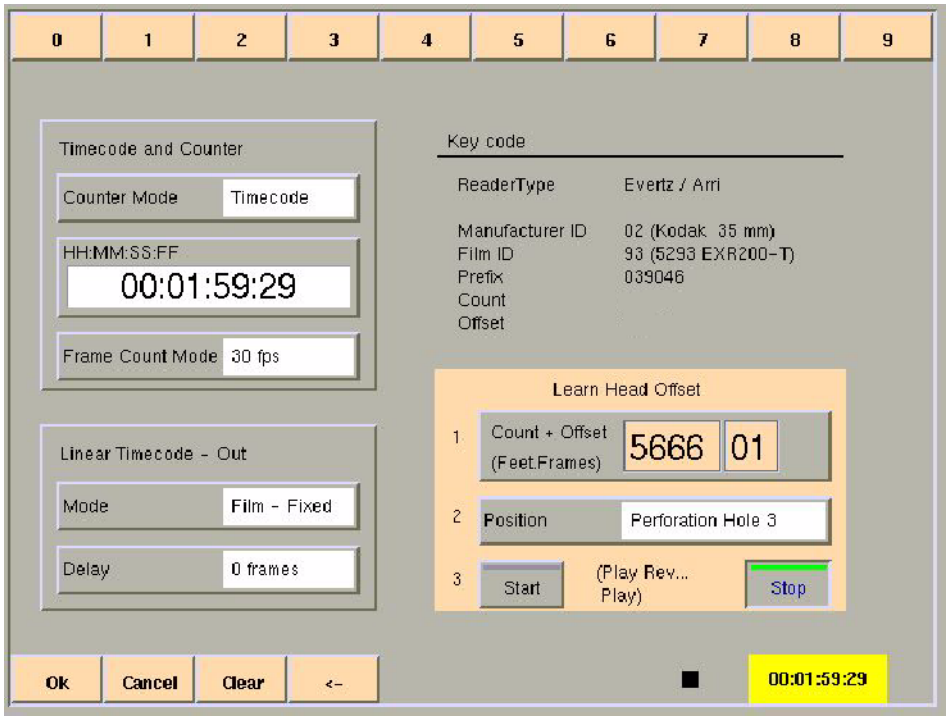


Fig. 325: Submenu **“Timecode“** with window **“Key Code”** setup

5. Press **“Start“** to execute the learn mode.
   While the Spirit 4K / 2K is in the “learn mode”, softkey **“Start“** is activated.
   Using **“Stop”** aborts the “learn mode”.

6. Rewind a short piece of film.
   Select PLAY mode and transfer the scene which includes the reference frame.
   Take care, that at least one keycode is read during this transfer.
   If the Spirit 4K has **learned the head offset** successfully, learn mode softkey **“Stop“** is activated again.
   If an error occurs during this procedure, a warning message will be displayed.
   Then you have to retry the head offset learning procedure.

7. Check the keycode.
   Play a short piece of film and take care that any keycode is read on the reader device and compare the keycode of the currently scanned frame with the displayed code (count & offset) in submenu “Timecode”.
   Field Keycode:
   Count: Film length in feet
   Offset: Frame offset

3.3.6.6 Remarks Concerning “Keycode in Data”, LTC

Data Output

- The keycode generated in the Spirit 4K / 2K is available in the DPX Data.

Servo Locked

- Keycode is only evaluated if the servo is locked.

Framing

- In case framing will be adjusted more than ±1 perf, the keycode coult count wrong!

If count errors occur

- If keycode “count” and “offset” do not match to the right frame, please check that the keycode position (reference dot) and “head offset” are properly adjusted.

Auto Adjust

- If the keycode position (reference dot position) changes during a transfer with a fixed speed, the system automatically adjusts the new position.

  Note for EVERTZ Reader!
  This works only, if at least one keycode before the position change and one keycode after the change are read with the same speed and play direction.

Reader Type

- The reader type (AATON or EVERTZ) is automatically adjusted after the reader has read and transferred any key code to the Spirit 4K / 2K.

The Standard

- Additional information about the keycode standard see also www.kodak.com.

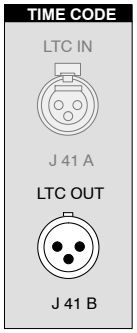
Keycode Display Specter VDC 2000 and Phantom Transfer Engine

- The keycode information is also available in addition to the timecode information on the timeline of Specter VDC 2000 and the Phantom Transfer Engine, if the DPX header contains valid keycode information.

  Only the keycode of the current playout frame is displayed.

3.3.6.7 Remarks Concerning Linear Time Code (LTC) (for future use)

Rack 3



For future use!

LTC, compatible to the SMPTE 12M standard, is available at jack LTC OUT (in preparation, Rack 3) and will always be generated in “non drop frame mode”.

Assignment of userbits
If a keycode reader is installed, the keycode will be mapped into the userbits.

Restrictions of LTC operation

- **LTC transfer via TE 2101 Transfer Engine Package 101**
  The transfer of LTC via Transfer Engine 101 to a workstation (e.g. OS2 / SGI) causes a fixed delay of one frame. Example: Spirit 4K / 2K sends LTC 00:00:00:00, Transfer Engine reads 00:00:00:01.
  Problem can be solved with LTC Delay in this submenu

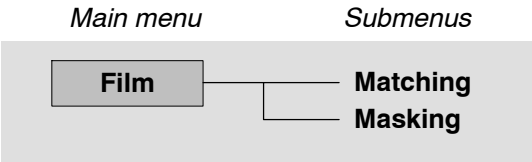
- **LTC synchronizing for SEPMAG players** (only with Audio option)
  Do not feed the audio signal of an externally connected Sepmag player, synchronized with LTC output (J41 LTC OUT Rack 3) from the Spirit 4K / 2K, through the audio system of the Spirit 4K / 2K - Audio 1/2 In to Audio 1/2 Out - for a signal mix of Spirit 4K / 2K audio and Sepmag audio.
  In this case audio is delayed versus video, because it passes the film scanner audio delay which is active for audio, coming from the audio head of the DataCine SDC 4000 / SDC 2048.
  A Sepmag player synchronized with the bi-phase signal (J25 SEPMAG OUT / Rack 2) operates correct, audio / video are synchronal.

Notes!

- ***Drop frame / Non drop frame mode***
  Drop-frame compensation for the 59.94 Hz standard is not supported.
  *Spirit 4K / 2K operates always in **“non drop frame mode”**. That means, that for film speeds 30 or 24 fps and TV standard “59.94 Hz interlace” always 30 / 24 time code values are generated.*

- ***Counting mode for progressive standards***
  *For all 59.94 / 60 Hz progressive standards **one time code value** is allocated to **two frames.***

3.4 FILM MENU



3.4.1 SUBMENU “MATCHING”

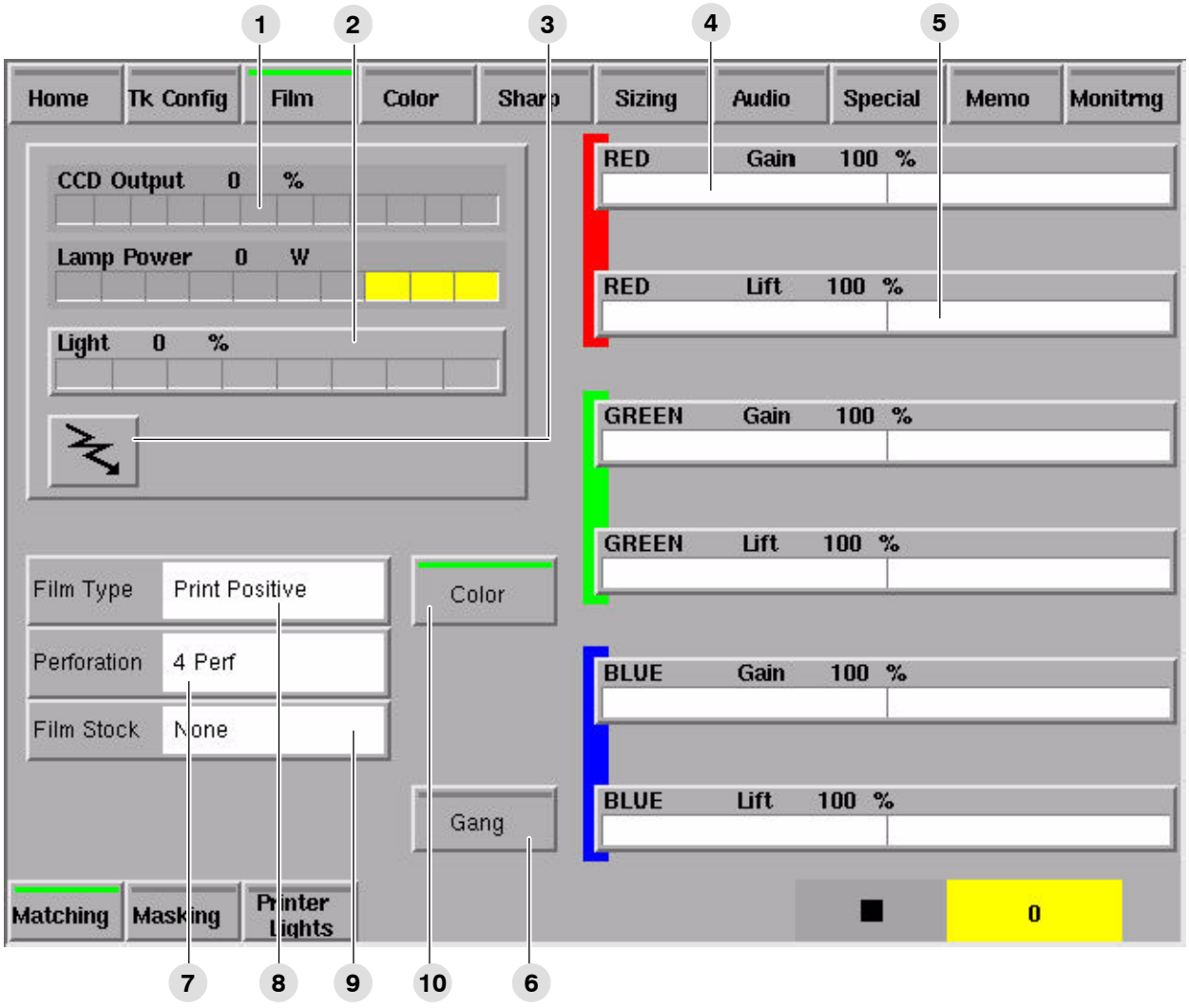


Fig. 326: Main menu **“Film”** / submenu **“Matching”**

The main menu **“Film”** / submenu **“Matching”** shows the user the matching settings in the black (Lift) and white (Gain) areas, the intensity of film illumination, the video level and the film settings (film type and video basic gain):

1 **CCD Output**

For future use!

2 **Light**

Serves to adjust the intensity of light falling through the. Has to be set to 100% video level. See Monitoring, testpoint 1.
To modify the light level slide directly on the touchscreen or click on the window to delegate the control onto the trackball of the GCP panel.

Observe the indication of the **Lamp Power**. Do not operate in the critical area (yellow marked). This can lead to unwished intencity fluctuations in the picture.

3 **Display**

Shot button , serves (during Play) for setting the intensity of film illumination to **100% video level** at once.

4 **5** **Matching Controls Lift RGB** / **Gain RGB**

Adjustment of these controls are vital in order not to clip any parts of the signal. To modify settings either use the adjacent digipots or slide on the touchscreen.
First adjust RGB Gain (amplification) on then RGB Lift (positioning). During adjustment watch the RGB signals on a graphics monitor connected to the monitoring output. Set to testpoint 2 (Mask Match) respectively testpoint 5 (Transfer LUT) when CPD LUTs are selected. Use channel mode “Parade” and/or “Overlay”.
Note that unity values in this section are different in dependance of selected filter type and control range mode (Uncoupled, B&W Coupled).

6 **Gang**

If the button Gang is switched on, Lift and Gain Level of all three channels (RGB) are modified concernedly by using only one of the controls.
The ratio between the three levels (”Gains” or ”Lifts”) is maintained in this operation mode.

7 **Perforation**

This window serves for perforation selection in dependence on the film to be played. The number of perforation holes per film frame determines the value to be set.

Selection with 35mm film:
2 PERF / 3 PERF / 4 PERF / 6 PERF / 8 PERF

Notes Concerning 8 Perf Mode!
The vertical position of the 8 perf image requires a 90º rotation of the scanned image in order to be correctly reproduced at the video outputs. 16bit data output format with 4K resolution is not supported !

8 **Film Type**

This window contains the filter type selection.

Selection:	Print Pos / Neg Intermediate Pos / Neg Color Pos / Neg
"Print Positive"	used with print films, POS: negative inversion OFF
"Print Negative"	used with print films, NEG: negative inversion ON
"Intermediate Pos"	used with intermediate films, POS: neg. inversion OFF
"Intermediate Neg"	used with intermediate films, NEG: neg. inversion ON
"Color Positive"	used with color films, POS: negative inversion OFF
"Color Negative"	used with color films, NEG: negative inversion ON

Note!
Orange masks in Negative or Intermediate materials are optically compensated by introducing bluefilters of different kinds into the light path of the film scanner.

Print Pos or Neg:
The "Print POS" selection creates a spectral balance of illumination that, in conjunction with electronic masking or matrixing, allows color reproduction of print films according to the one achieved in optical projection.
The "Print NEG" selection creates a spectral balance of illumination that allows scans of unmasked or B&W negative films.

I**ntermediate Pos or Neg:**
The "Intermediate POS or NEG" selection creates an illumination color spectral balance with sensitivity peaks that closely match the film dye density peaks of Eastman EXR Color Intermediate Film 5244. This mode of illumination also compensates for the red, green and blue minimum densities (D-min) caused by colored masking coupler found in the Eastman EXR Color Intermediate Film 5244 stock.

RESTRICTIONS:

Film Speed Restrictions

The maximum film speed for 6/8 perf mode is 30 fps fixed speed in SAS.

ACA LGA *The ACA Lens Gate Assembly is not supported in the 6/8 perf mode.*

ACA Emulation

The ACA emulation is not supported in the 6/8 perf mode.

Markers *Markers are not supported in 6/8-perf mode.*

Framing *Framing shifts the image horizontally.*

Editing Operation

The ballistic of the servo system in the filmdeck is changed for 6/8 perf mode. That means editing operation with the default telecine controller parameter is not accurate (Pre-roll, stop etc.). Please find out the new 6/8 perf setup parameter by testing the editing functions of your telecine controller in 6/8 perf mode.
Use alternatively he “default setup” or the “6/8 perf setup” parameters depending of the 2-4 perf or 6/8 perf mode (run-up time has been changed to approx. factor 2).

9 **Film Stock**

For future use !

10 **Color**

For future use!

3.4.2 SUBMENU “MASKING”

Fig. 327: Main menu **“Film”** / submenu **“Masking”**

3.4.2.1 Overview

The submenu **“Masking”** serves the color adaption to the scanned film.
Adaption is made optionally by selection of fixed or variable masking coefficients.
Print, intermediate and color films are adaptable

1 **Current User**, shows the selected user setup from menu TK Mems

2 **R / G / B in * C1 / 9 = R / G / B out** represents the matrix equation

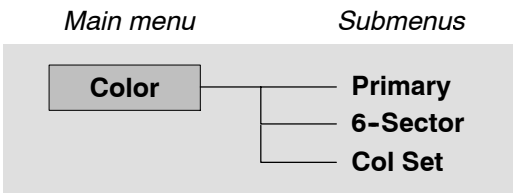
$$\begin{pmatrix} \text{R in} \\ \text{G in} \\ \text{B in} \end{pmatrix} * \begin{pmatrix} C1 & C2 & C3 \\ C4 & C5 & C6 \\ C7 & C8 & C9 \end{pmatrix} = \begin{pmatrix} \text{R out} \\ \text{G out} \\ \text{B out} \end{pmatrix}$$

3 **Film Masking**, to switch on / off the masking adjustment.

4 **Matrix**, to select individual or fixed masking coefficients.

Fixed masking coefficients, see next paragraph.
If “**New Matrix**” is selected a dialog appears**,** to enter the name of new individual masking coefficients.

3.5 COLOR MENU



3.5.1 SUBMENU “PRIMARY”

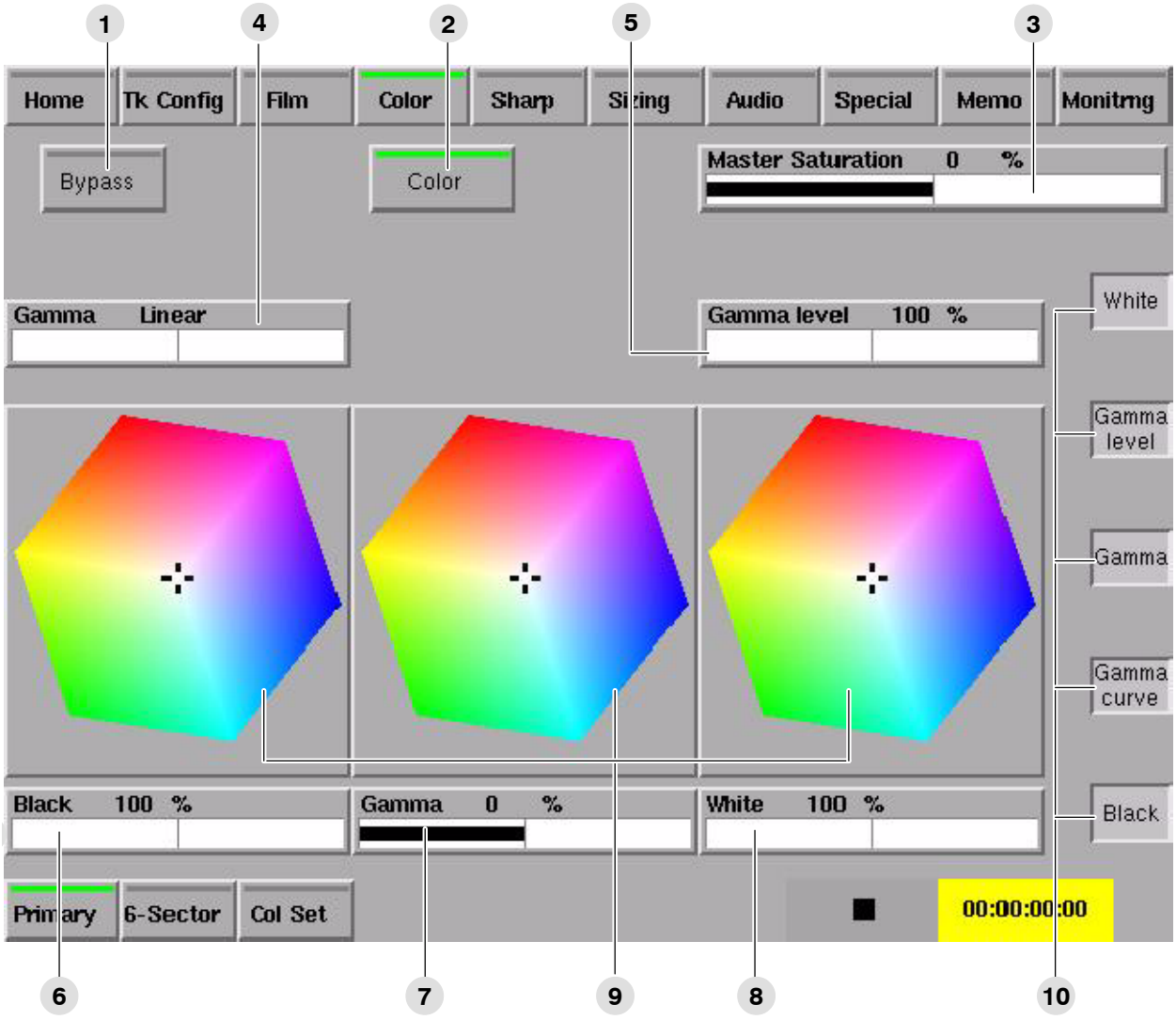


Fig. 328: Main menu **“Color”,** submenu Primary

3.5.1.1 Overview

1 Button “**Bypass**” switches the Primary Color Correction on / off. For images which should not be affected by the Scanner’s Primary Color Correction the BYPASS key must be switched on.
BYPASS is enabled when the bar on the button is yellow.

2 **Color** (For furture use!)
To switch **on** / **off** the color information. For TV mode only, does not affect the data output.

”off”	for black/white films
”on”	for color films

3 **Master Saturation**
[This item is intended for SDC 4000 / SDC 2048 DataCine only!]

This button controls the overall color saturation. It works in both directions: you can **desaturate or enhance saturation.** The default value is 100%. To operate, use the digipot control or slide directly on the touchscreen.

4 **Gamma Curve Linear**
This function stretches or compresses the gamma curve in the black/white parts of the picture.

There are 5 positions available:
Black Stretch, Black Compress, Print Black Dominant, Print, Print White Dominant, White Compress, White Stretch, Invers Print.

Linear is the default value.

To operate, use the corresponding digipot or slide directly on the touch-screen. Apply **Print** = **Black Compress** and **White Compress** to easily achieve ”print look” when working with negative film. Use **Black Stretch** to brighten up the blacks when working with high contrast Prints.

5 **Gamma Level**
This function allows to adjust the strenght of the selected curve from 0 up to 200%.

To operate use the corresponding digipot or slide directly on the touch-screen. 0% is like “Linear” mode, while 200% gives the most enhancement in blach/white.

6 **Master Black** controls the dark parts of the picture.
Master Black sets the darkest level of the picture.

7 **Master Gamma** controls the mid-tones of the picture.

8 **Master White** controls the light parts of the picture.
Master White sets the brightest level of the picture.

The combination of these controls and especially bringing GAMMA up or down makes the picture look softer or harder in contrast.To operate, use the corresponding digipot or slide directly on the touchscreen.

9 **RGB Back** / **Gamma** / **White**
These controls are used to change the color balance in the **Black**, **White** and **Gamma** (mid-tone) parts of the picture.
There are two ways of operating:
Take a pencil (or your finger) and slide directly on the colored hexagon of the touchscreen.
The more comfortable way is to use the trackball. By clicking on the area around the hexagon, the control is delegated to the trackball.

The currently active control (Black, Gamma or White) is then highlighted. The cursor inside the hexagon indicates the working position.

10 Digipot to adjust the parameters.

3.5.1.2 Gamma Curve - Black Stretch / Compression

With Gamma curve “Black stretch / compression” the contrast in dark picture areas can be either enlarged or reduced. Four different characteristics according to the diagram in figure Fig. 330: are available. Unlike Master gamma, bright picture areas are less affected by this adjustment. The black level is kept constant as well.

1. To use Black stretch / compression -, select menu Color, submenu Primary

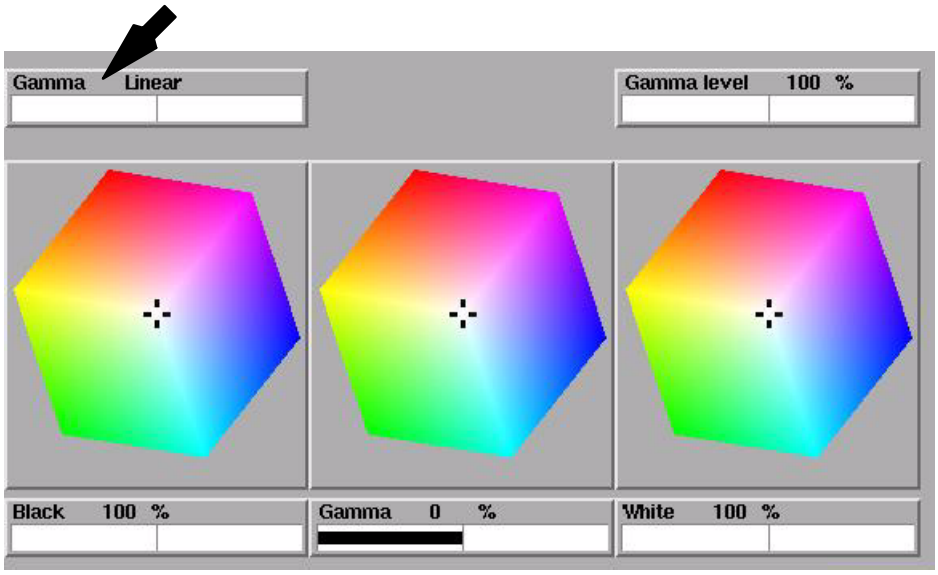


Fig. 329: Main menu **“Color”**

2. To select the parameter slide directly on the touchscreen or use the digipot control. The different curves in black are:

   High (big) black **compression**: e.g. 20% level changes to 5%
   Low (small) black **compression**: e.g. 20% level changes to 12%
   linear level, no changes
   Low (small) black **stretch**: e.g. 20% level changes to 28%
   High (big) white **stretch**: e.g. 20% level changes to 35%

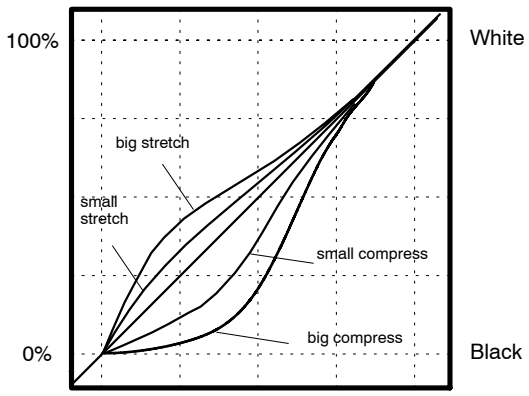


Fig. 330: Black stretch / compression

3.5.1.3 Gamma Level - White Stretch / Compression

With Gamma Level - white stretch/compression -, the contrast in bright picture areas can be either enlarged or reduced. Four different characteristics according to the diagram in figure Fig. 330: are selectable. Unlike Master Gamma, dark picture areas are less affected by this adjustment. Note that white stretch does not lead to any clipping of highlights (luminance levels above 100%).

1. To use Gamma Level - white stretch / compression, select menu Color, submenu Primary
2. To select Gamma Level slide directly on the touchscreen or use the corresponding digipot

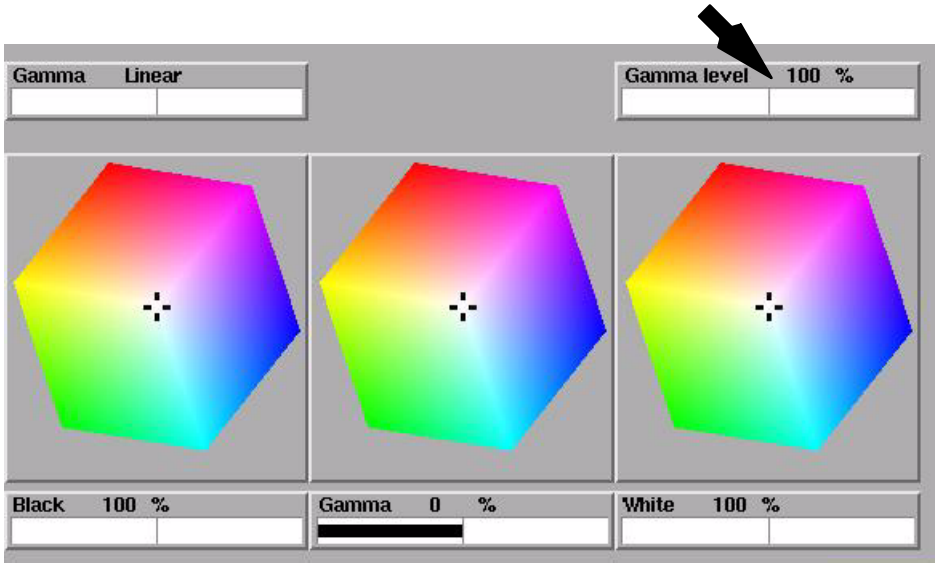


Fig. 331: Main menu **"Color", submenu Primary**

3.5.1.4 Gamma Curve & Level (Black and White) Combined

By combining Curve & Level (black and white) compression, a print film look can be generated.

1. Select menu Color

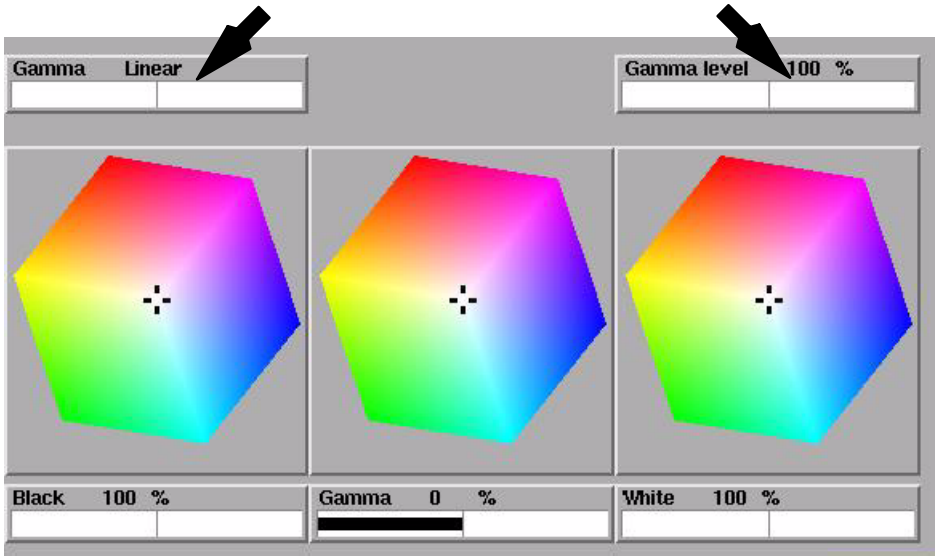


Fig. 332: Main menu **"Color", submenu Primary**

2. Choose Toe (black) parameter by sliding directly the touchscreen

   The different curves for black compression are, see figure Fig. 333:

   High (big) **black compression**: e.g. 20% level changes to 5%
   Low (small) **black compression**: e.g. 20% level changes to 12%
   linear level, no changes

3. Choose Shoulder (white) parameter by sliding directly on the touchscreen

   The different curves for white compressed are,

   High (big) white **compression**: e.g. 80% level changes to 95%
   Low (small) white **compression**: e.g. 80% level changes to 88%
   linear level, no changes

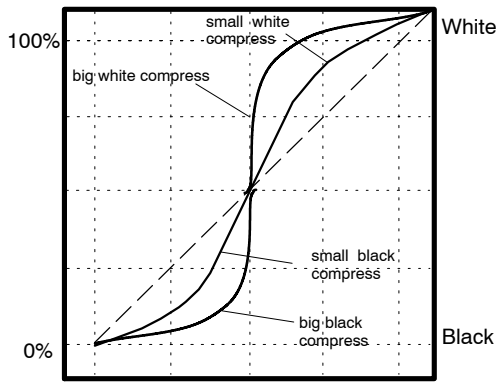


Fig. 333:

3.5.1.5 Extended Color Correction Ranges

"Extended ranges" are activated with the controls **Black**, **Gamma** and **White**

Black RGB	Range from	–100% to +100%
Black MASTER	Range from	–100% to +100%
Gamma RGB	Range	±60% of Master Range
Gamma MASTER	Range from	0 to 2.5
White RGB	Range from	0% to 200%
White MASTER	Range from	0% to 1000%

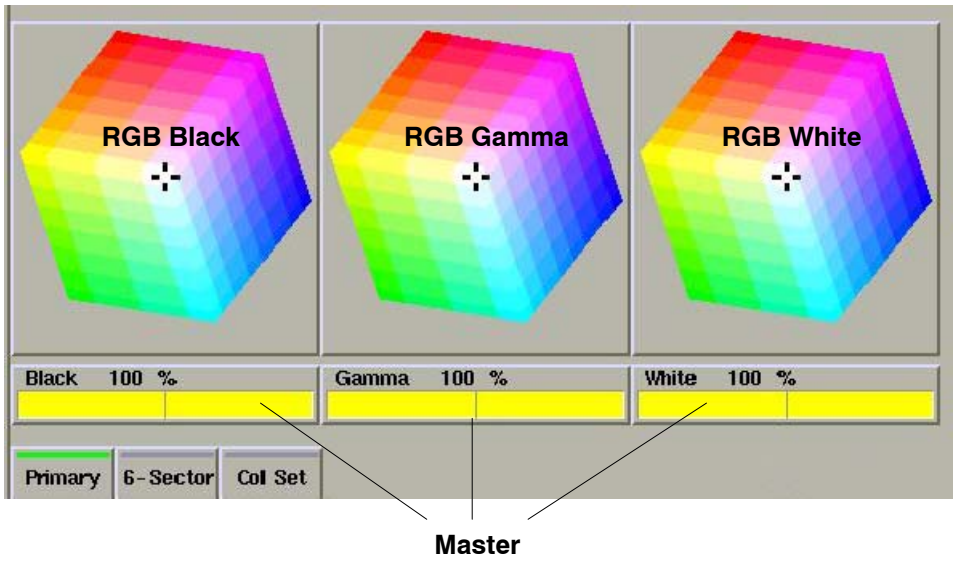


Fig. 334:

3.5.2 SUBMENU 6-SECTOR (OPTION)

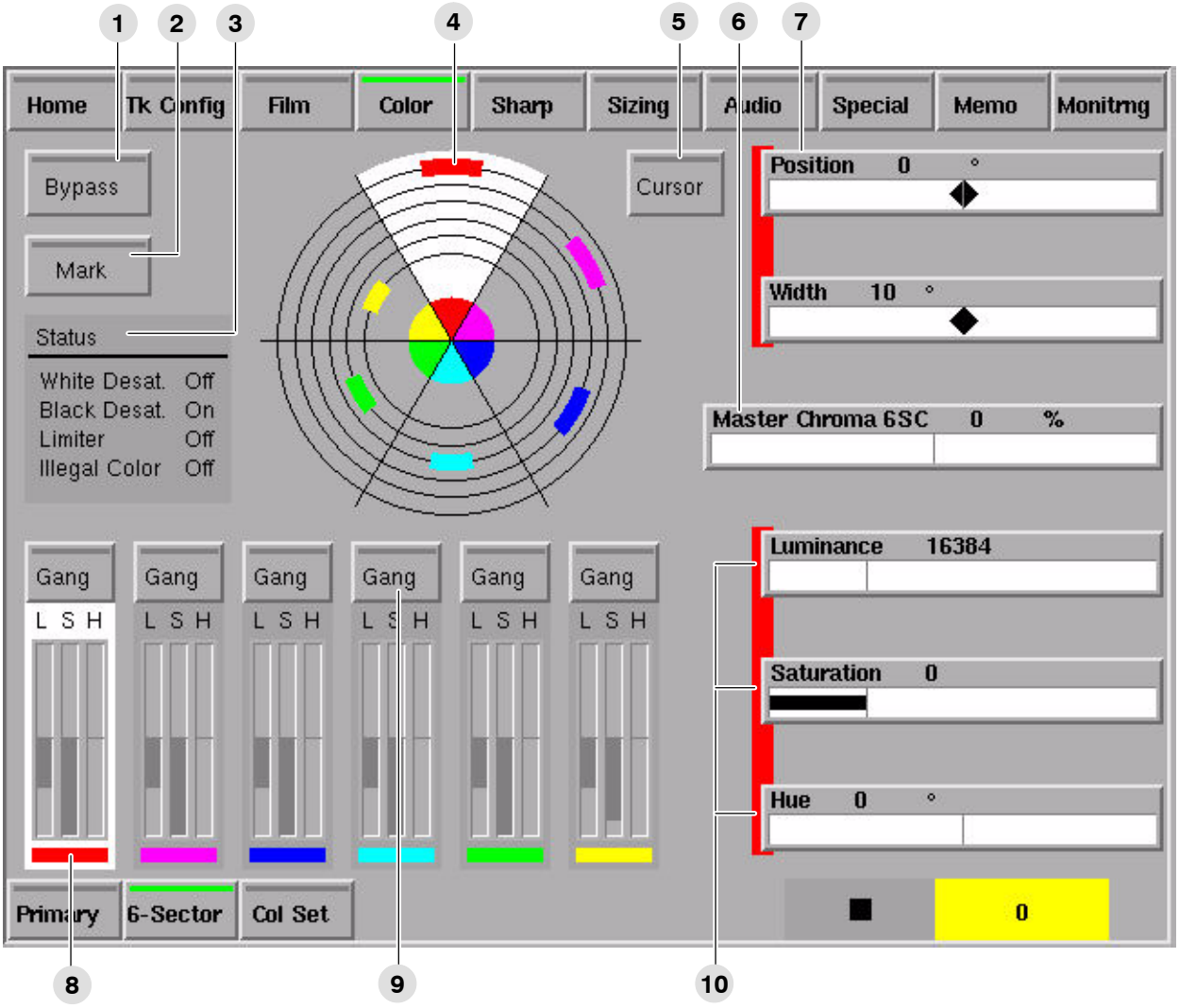


Fig. 335: Main menu **"Color"**, submenu 6-Sector

3.5.2.1 Overview

This submenu allows a selective color correction based on six color sectors Red, Green, Blue, Yellow, Cyan and Magenta.

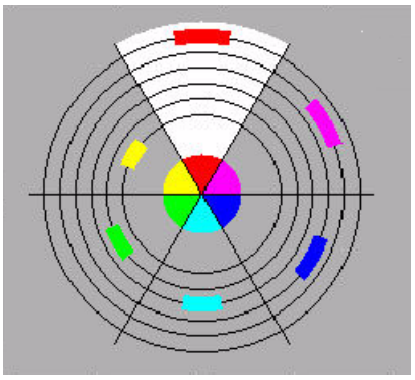
1 Button "**Bypass**" switches the secondary 6-Sector Color Correction on / off.

For images which should not be affected by the 6-Sector Color Correction, the "**Bypass**" button must be switched on. Bypass is enabled when the bar on the button is yellow.

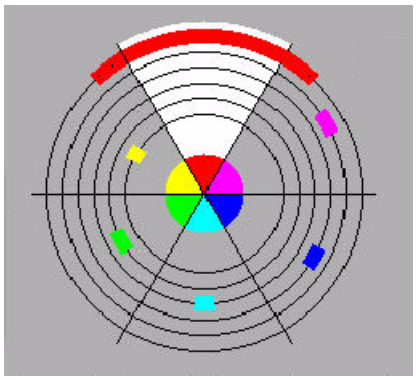
2 Button “**Mark**” separates a certain color which later on can be altered with the modifying keys of the 6-Sector Color Correction.
Different setups (”**Flashing**” or “**Solochrome**”) for the “**6 SC Color Marker”** can be selected on the next submenu “**Col Set**“. Click on the key to activate the “**Mark**” function (enabled when the bar on the key is yellow).

3 Display of the status “**Col Set**” submenu.

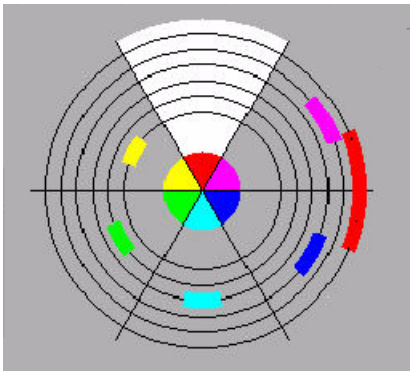
4 Qualifying scheme and display of the color circle with six color sections. The color circle, one part of the qualifying scheme, serves for selection of the color and to display its position and width.
The currently chosen sector is highlighted. See examples below:



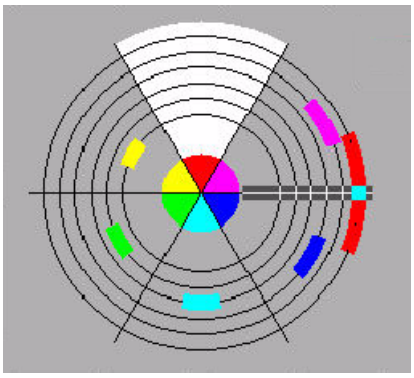
Red sector selected.
Width = 10°
Position = 0°



Red sector selected.
Width = 80°
Position = 0°



Red sector selected.
Width = 35°
Position = -90°



Red sector selected.
Width = 35°
Position = -90°
Cursor activated

Fig. 336: Examples

5 “**Cursor**”

A crosshair cursor will be displayed on the screen. The cursor can be positioned by the Trackball. It allows to read the hue value of an addressed pixel at the output of color correction processing. The value is calculated as average over four pixel. The hue value may be displayed in respect to the qualifying sectors on a menus qualifying scheme.

Cursor is enabled when the bar on the button is yellow.

6 "**Master Chroma 6SC**" serves for global color saturation. This is a saturation control affecting all sectors in the same way.
It is different from the saturation control in the "Primary" menu as it is located on the secondary 6-Sector Color Correction board.

To operate, move the slider on the touchscreen or use the digipot control. Master Chroma ranges from 0 to 200%, the default value is 100%.

7 "**Position**" and "**Width**" sliders alter hue and the angle of the selected (see item **7**) color section .
"Position" alters the hue, e.g. if the red you want to modify is rather on the purple-tinted or on the orange-tinted side. To operate, move the slider on the touchscreen or use the digipot control.
Position ranges from -180° to +180°, default is 0°.
The current position is displayed on the qualifying scheme **7** .

"**Width**" defines the angle, i.e. the range of tints that will be affected by the modification. Big width represents a broad angle, a bigger section of e.g. red tones will be affected, small width represents a thin angle, only few red tones will be affected.
To operate, move the slider on the touchscreen or use the digipot control. Width ranges from 10° to 360°, the default value is 60°.
The current angle is displayed on the qualifying scheme **7** .

8 Graph display of luminance (**L**), saturation (**S**) and hue (**H**) values for the six color sections. The selected color section is highligted.

9 **Gang**
Normally the sliders for "**Luminace**", "**Saturation**" and "**Hue**" influences the area of the selected colors sector only! By pressing one or more "**Gang**" buttons of unselected sectors the slider modifications are taken for the respective sectors.

10 **Luminance**, **Saturation** and **Hue** sliders for modifying the selected color.
Once the qualifying is done, the separated color areas can be modified by changing Hue, Saturation and/or Luminance. To operate, move the slider on the touchscreen or use the corresponding digipot control.

- Luminance and Saturation range from 0 to 400%, default is 100%.
- Hue range is +/-180°.

The modifications are visible in the bar graph display **8** . The graph which belongs to the activated sector is highlighted and the colorbar of the modifying keys shows the corresponding color.

In conjunction with the "**Mark**" function the sliders serves to separate (to qualify) the color which shall be modified. Enable the "**Mark**" function and select the color sector which comes closest by clicking on it.

In dependence of the selected "6SC Color Marker" (in "Col Set" submenu) parts of the picture (on your picture monitor) get in some way highlighted.

There are two settings available: "**Solochrome**" and "**Flashing**".
All modifications are weighted with the saturation to avoid noise increase for low saturated objects.

To perform a smooth transition between modified colors, each sector has a center hue where all modifications will apply 100%, and a symmetric width with a linear decrease of the modifications towards zero at the sector boundaries. To allow a creative color makeup the center position and the sector width can be modified individually for any of the six sectors, to select a particular color or color range that is intended to the modified or altered.

Each sector allows altering of luminance saturation and hue for the sectors selected color range.

3.5.3 SUBMENU COLOR SET

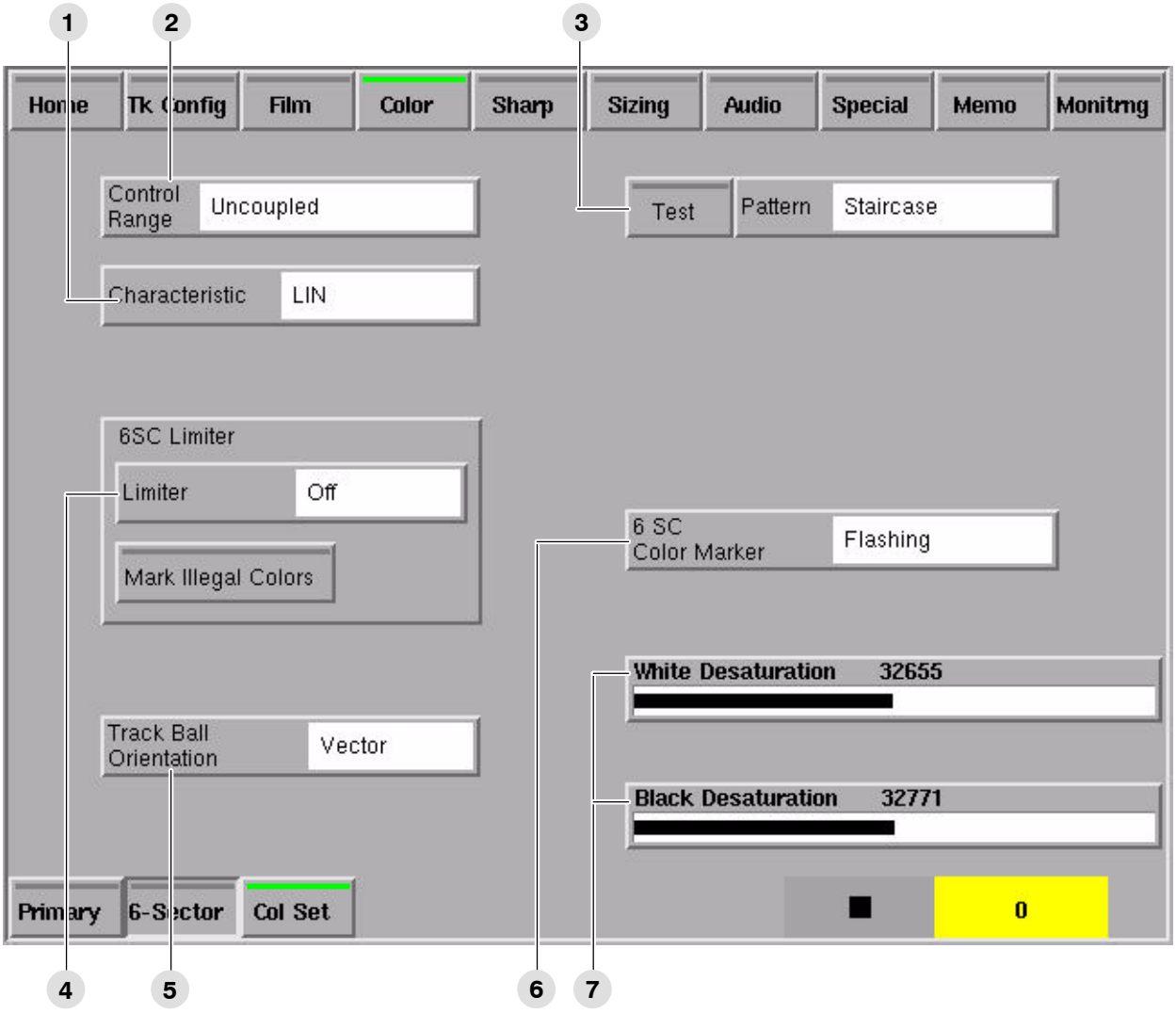


Fig. 337: Submenu Color Set

This menu provides various setups related to color grading

3.5.3.1 Overview

1 Characteristic

[The following item is intended for SDC 4000 DataCine only!]

Selection of the picture characteristic for the SDTV output.
Selection:
"LIN", "CPD" ,"CRT"

CRT is a gamma function to compensate the gamma of a picture monitor. In order to judge a picture content (in terms of gradation) by looking at a monitor, CRT has to be switched on. When working with Data, the end product is not necessarily video or a TV picture but a picture recorded back on film or a picture which will be projected by a video beamer. In this case, a Output

LUT (lookup table) will be chosen that replaces the CRT gamma by its own characteristic. Depending on the selected Output LUT, CRT GAMMA will automatically be switched on or off.

2 Control Range

This button is used to set the control range to **Uncoupled**, **Coupled Black** or **Coupled Black&White**.

NOTE!
Gradings done in "Uncoupled" mode lead to different results when switched to "Coupled Black&White" mode and vice versa!

NOTE!
"Coupled Black&White" is standard mode for Spirit 2K!

3 Test Pattern

Switches the test pattern (-signal) on or off. The preselection of the test signal ("Staircase", "Sawtooth", "Color Bars" ...) is made in the dropdown menu "Pattern" within submenu **"Setup"**.

ON:	Test signal
OFF:	Film signal

4 6 SC Limiter

There are 6 different limiter settings available: **Soft 108, Hard 108, Soft 102, Hard 102, Soft 100, Hard 100.**
"Soft" implies smooth limiting (a knee function is applied),
"Hard" stands for signal clipping.
Value "100" limits RGB range between 0% and 100%,
value "102" limits RGB range between 0% and 102%,
value "108" limits RGB range between 0% and 108%.
"Off" stands for no limitation.
Click on the button and make your choice from the drop-down menu.Note that this limiter only affects the signal output of the 6-SC Board. This is not identical to the output signal of the scanner as the RGB signal coming from the 6-SC Board is processed further on.

Mark Illegal Colors
If enabled (the green bar on the key is lit) all illegal colors according to the selected limiter mode will be highlighted by an inverted luminance signal. Note that in case the 6-SC Limiter is switched to "Off", this key has no function.

5 Track Ball Orientation

This button refers to the Delta Controls (Hexagons) of the "Primary" menu. The trackball orientation can be switched between "**Vector**" which means vectorscope like orientation and "**MK III**".
"**MK III**" is derived from Rank Mark III machines and it rotates the orientation clockwise through 120° relative to the vectorscope display.

6 6 SC Color Marker

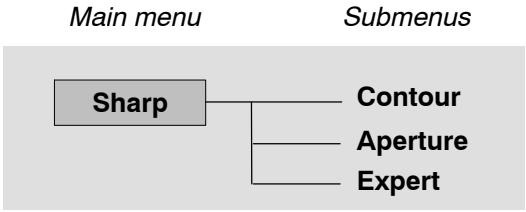
This menu page contains the 6-Sector Color Marker Setup. You find the switches to enable the Marker on the “6-Sector” menu. This feature in conjunction with the qualifying scheme makes it easy to separate a certain color which later on can be altered with the modifying keys of the 6-Sector Color Correction.
There are two settings available: “**Solochrome**” and “**Flashing**”.

With “**Solochrome**” enabled only the selected color is visible in the picture. E.g. select the blue sector in the 6SC menu and the only visible color in the picture is blue. The colors corresponding to the other 5 sectors are desaturated. Now use the “**Position**” and “**Width**“ keys in order to refine the color separation within the blue sector.
With “**Flashing”** enabled the luminance part of the selected color is alternately switched from 0% to 100% (which results in flashing).
Click on the key and -according to your preferences- choose from the drop down menu. The current selection is shown on the key display.

7 Black and White Desaturation

The saturation will be modified as a function of the signal luminance. The desaturation function is independently selectable by two desaturation values for black and white. The “**Black Saturation**” level has full effect for 0% luminance decreasing with gradient 2 to higher luminance levels. The “**White Saturation**” level has full effect for 100% luminance decreasing with gradient 2 to lower luminance levels.

3.6 SHARP MENU



3.6.1 SUBMENU “CONTOUR”

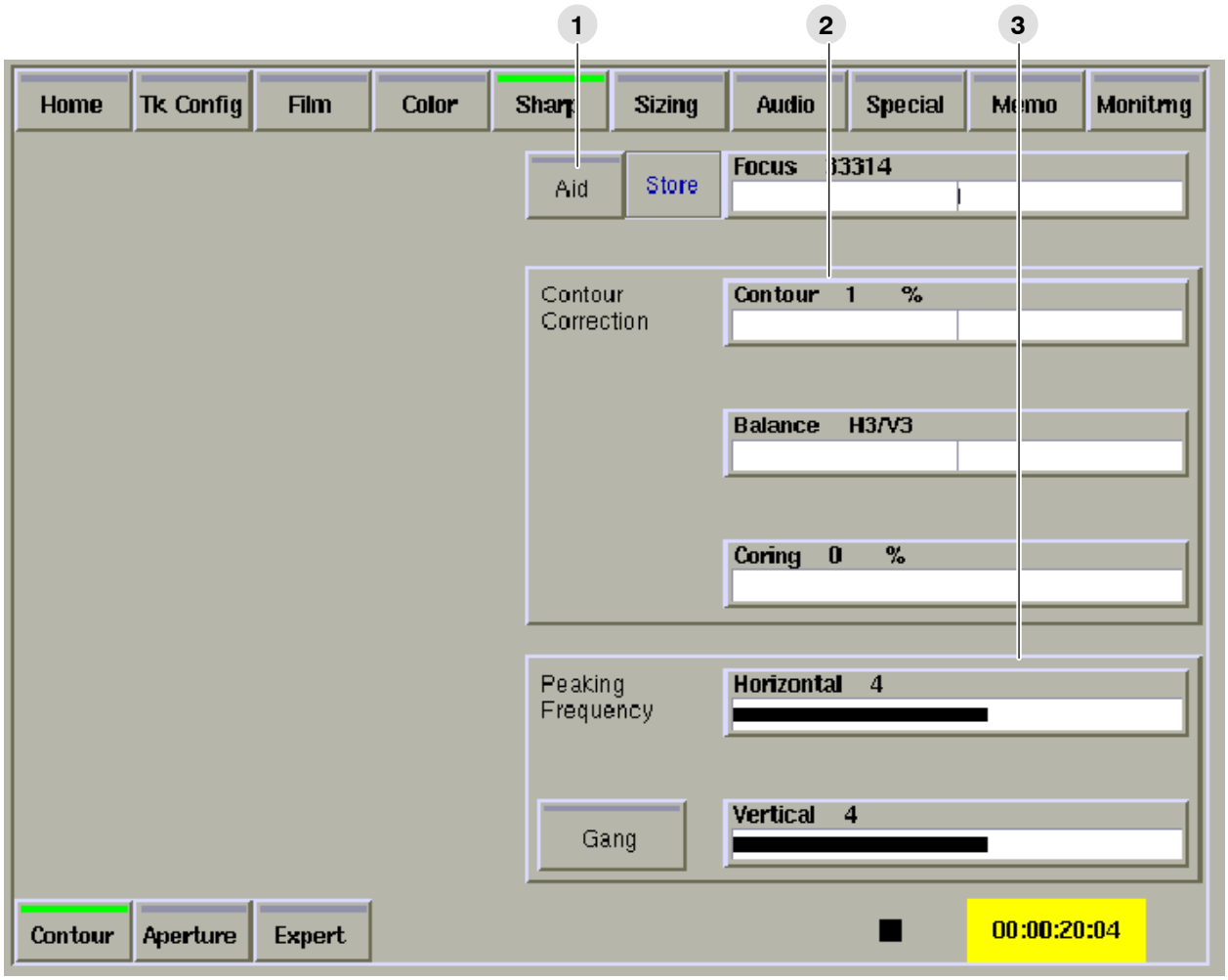


Fig. 338: Main menu **“Sharp”** / submenu **“Contour”**

1 **Focus**

Use Focus Control to adjust the optical sharpness of the film material currently being scanned.The focus can be controlled either via LCP or GCP:

LCP:	Switch the scanner to local control mode.
[future function]	Press the Focus button on the LCP (is lit when active), and use the Shuttle wheel to adjust the focus
GCP:	Switch the scanner in remote control mode. To adjust focus directly slide on the touchscreen or use the adjustment digipot.

The focus control drives the focus servo in the film scanner.

Hitting the **Aid** button sets zoom and contour to maximum and slows down the film speed to 6 fps. Thus, film grain will appear as large and clear as possible which helps to find the optimum focus position.

For factory and service use only:
Hitting the **Store** button opens a dialog window. With **OK**, your new setting will be stored and recalled next time when **Unity** is pressed.The default focus setting is important as this value is used during FPN and affects the quality of the FPN.

2 **Contour**

[This item is intended for SDC 4000 / SDC 2048 DataCine only!]

For adjusting the contour correction in the luminance channel with associated +/– display. The contour correction starts with ”0” and increases with ”+” values and decreases with ”–” values. For optimum adjustment Coring should be set first to 0%. The contour correction contains following grading setup adjustments:
Contour (Gain) Balance, Peaking Frequency H and Peaking Frequency V.

Balance
For balance adjustment between H and V contour correction (fading in 7 steps).

Selection: H only / H3/V1 / H3/V2 / H3/V3 / H2/V3 / H1/V3 / V only

”H only”	only H contour correction adjustable
”H3/V1”	
”H3/V2”	
”H3/V3”	H and V contour correction adjustable
”H2/V3”	
”H1/V3”	
”V only”	only V contour correction adjustable

Coring
To reduce the contour enhancement for fine low contrast details like grain. The standard value 0% applies the selected amount of contour correction to all details. For grain reduction an adjustment value around 10% is sufficient. At 100% coring value, only very high contrast details are enhanced.

3 **Peak Frequency**

This function offers contour enhancement in dependence on detail size (spatial frequency). In order to enhance small picture details, select a higher value (high values correspond to high frequencies), to enhance contours of coarse details, select a low value.

Horizontal / **Vertical**
To change the settings, slide on the touchscreen or use the digipot controls. The controls for **vertical** and **horizontal** peaking can be handled separately but if there is no need for split settings use the **Gang** function.

Gang
If the button "**Gang"** is switched on, the horizontal and vertical peak frequency can be adjusted together with either one digipot or slider.
E.g. the vertical peak frequency level is changed and the horizontal level follows in the same way.

The ratio between both levels are maintained in this operation mode.
The ranges of the horizontal or vertical peak frequency are:

Selection: 0 / 1 / 2 / 3 / 4 / 5 / 6 / 7

"0"	range of the horizontal or vertical peak frequency set to 0
"1"	contour correction effects on coarse details
"2"	
"3"	
"4"	contour correction effects on fine details
"5"	
"6"	
"7"	contour correction effects on very fine details

3.6.2 SUBMENU “APERTURE”

[The following section is intended for SDC 4000 / SDC 2048 DataCine only!]

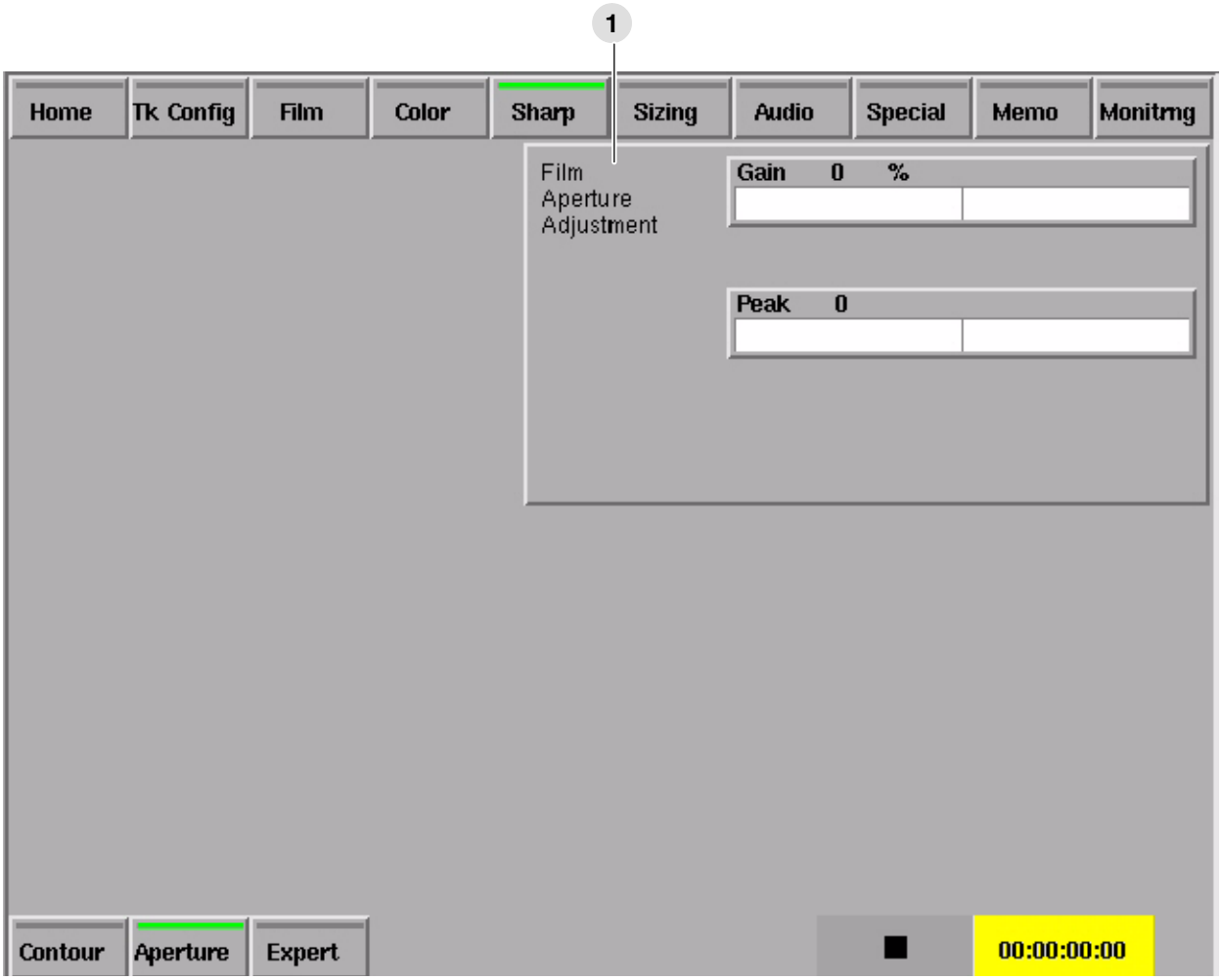


Fig. 339: Main menu **“Sharp”** / submenu **“Aperture”**

Aperture adjustment serves to adjust gain, peak and coring of the aperture and compensates system dependent frequency responses of the CCD sensors and the optics.

1 Gain

Gain adjustment of the aperture correction. The unity level is at 25%.

Peak

Adjustment of the peak frequency of the aperture enhancement.
Set Unity for optimum aperture correction!”
In **Unity**, the film related correction of the aperture ($f_{Nyquist}$ ~39 linepairs/mm for 35mm films) is set to optimum linear scanner response:
> 6.6 MHz (outband range) for SDTV
> 36 MHz (outband range) for HDTV
The unity level is at 25%.

3.6.3 SUBMENU “EXPERT”

[The following section is intended for SDC 4000 DataCine only!]

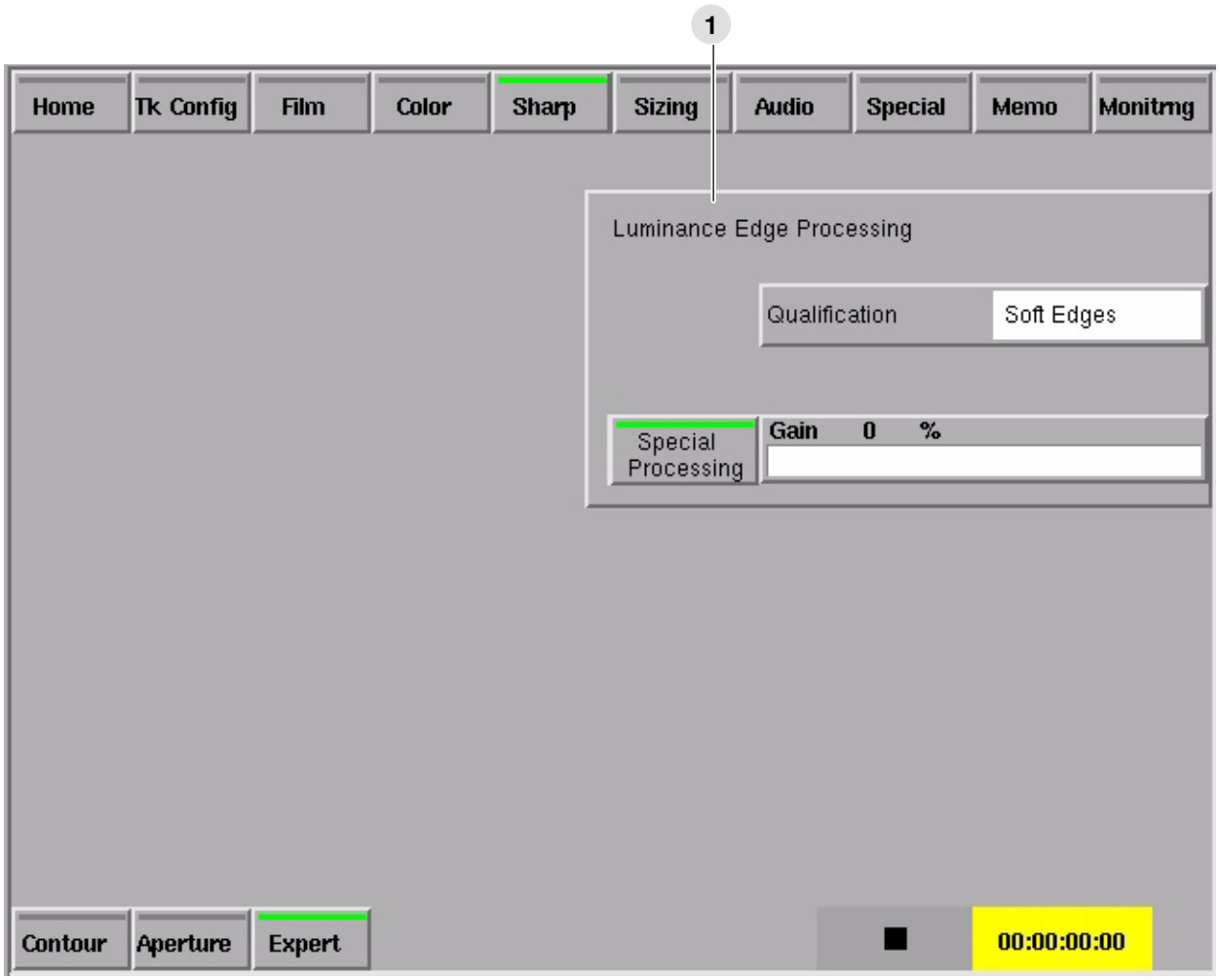


Fig. 340: Main menu **“Sharp”** / submenu **“Expert”**

Main menu **“Sharp”** / submenu **“Expert”** provides the controls for the Luminance Edge Processing. This function is designed to reduce ringing effects in the luminance channel. An adaptive filter is able to reduce the ringing effects at sharp transitions, mostly visible in 4:2:2 outputs.

1 **Special Processing**Luminance Edge Processing is enabled when the green bar on the button Special Processing is lit.

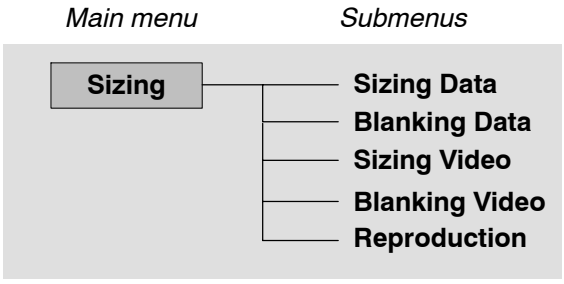
Qualification
Selection “**Soft Edges”** or **“Hard Edges”.** This qualification allows the luminance filter to react on sharp or soft transitions.

Gain
Gain can be adjusted from 0% (no filter influence) up to 100% (full edge influence)

Hints for Operation

- SDTV:
  Best results of ringing reduction will be achieved with maximum aperture correction, edge processing gain 20%...25% and frequency bandwidth 'high'. In case of ZOOM variations it is useful to switch bandwidth from 'HIGH' to 'LOW'.
- HDTV:
  Hard to achieve a better result with collared pictures. In case of Black/White material best result was achieved with bandwidth 'HIGH' and Gain 25% ... 50%.

3.7 SIZING MENU



3.7.1 SUBMENU “SIZING DATA / SIZING VIDEO”

Fig. 341: Main menu **“Sizing”** / submenu **“Sizing Data”**

Fig. 342: Main menu **“Sizing”** / submenu **“Sizing Video”**

The main menu **“Sizing”** / submenu **“Sizing”** shows the most important film scanning and film reproduction settings for sizing. The sizing menu shown above, applies to 35mm/4perf films.
For 16mm films and negative films, the display shows 16mm symbols or inverted symbols.

1 **Reproduction Window**

This window provides no controls, it only shows the settings of the Repro submenu.

2 **Marker**

Click on the button to insert the marker into the monitor picture. Marker is active when the yellow bar on the button is lit.
You can see the whole scanned film picture and inside the white lines your defined picture area.
To see how it works, use ZOOM for example and watch the marker lines, then switch Marker off again.
Note that Marker is not available with 6 perf (Cinerama) and 8 perf (Vistavision).

3 **H + V Size**

This control changes the geometry of the output picture. It can be squeezed or stretched by +/– 100% in horizontal and vertical direction.
Click on the area to activate the digipot control. When active, the sliders are highlighted.
To change the setting, slide on the touchscreen or use the corresponding digipot control.

4 **H + V Position**

Shifts the output picture horizontally or vertically by +/– 100%.
Click on the area to activate this function. When active, the sliders are highlighted.
To change the setting, slide on the touchscreen or use the corresponding digipot control.

Note!
VistaVision is possible without the Scaler option. In case of VistaVision the image will not be rotated 90 °. The data output window can be positioned via the H and V Position adjustors.

5 **1:1** (**Sizing Date** menu only)

In this mode the Scaler is switched to transparent mode. The data output window can be positioned via the H and V Position adjustors in the GCP Sizing menu.

Note!
Please no longer set the V-Size to "32894" on the GCP to switch the Scaler Filter "off" for a scan window of 24.92mm x 18.93mm at Image Resolutions of 2048 x 1556 and 4096 x 3112. Please change existing edit lists or TK Mems to be compatible!

6 **Zoom**

Use this slider to zoom in or out of the film frame. Zooming happens electronically. When exiting the selection, the last repro adjustment is stored.
Zoom range: 0.1x to 16x.

To change the settings, slide on the touchscreen or use the digipot control.

Sizing Video menu only:
You can switch this zoom control from **linear** to **nonlinear**.

Linear: Turning the digipot changes the adjusted values in linear 1:1 mode.
Nonlinear: The adjusted values change the faster the quicker the digipot control is turned.

7 **Rotation** (**Sizing Video** menu only)

This functions is used for rotating the film frame. With the adjacent control the picture can be rotated continuously from –180° to +180° in both senses (without resolution reduction!).
The picture can be rotated or skewed / tilted.
Click on the Rotate button and make your choice from the drop–down menu.

Three selections are available:
Rotation, Vertical and Horizontal Rhombic Effect.

The picture can be skewed or tilted in the range of +/–10% which equals 30°.

Note!
If this function is controlled via the POGLE Platinum or TK Mems Scan effects, Rhombic H or Rhombic V has to be activated over the whole correction list. Otherwise the effect will not be executed (even if you need this function only in one event of your list).

3.7.2 SUBMENU “BLANKING DATA / BLANKING VIDEO”

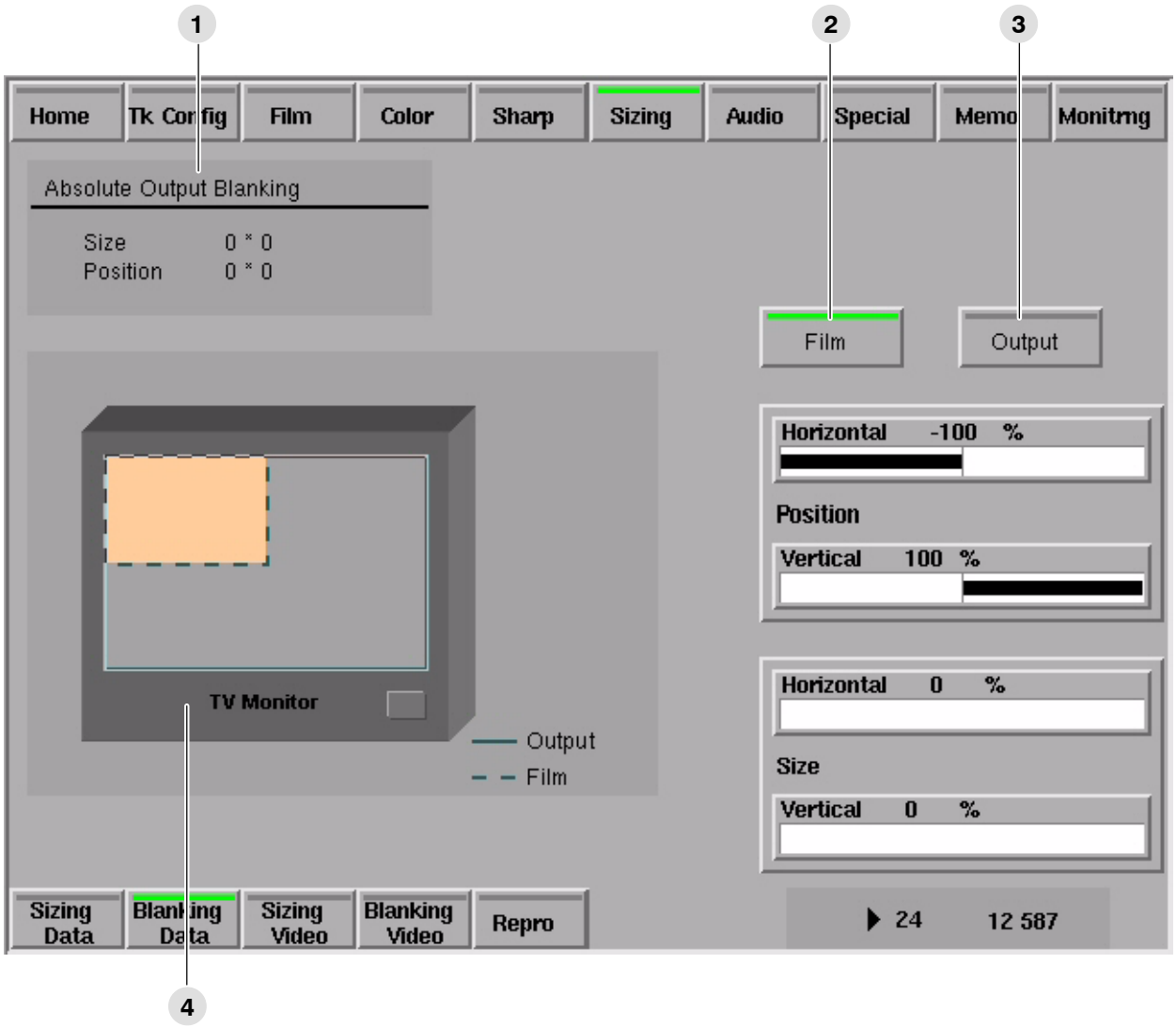


Fig. 343: Main menu **“Sizing”** / submenu **“Blanking Data”**

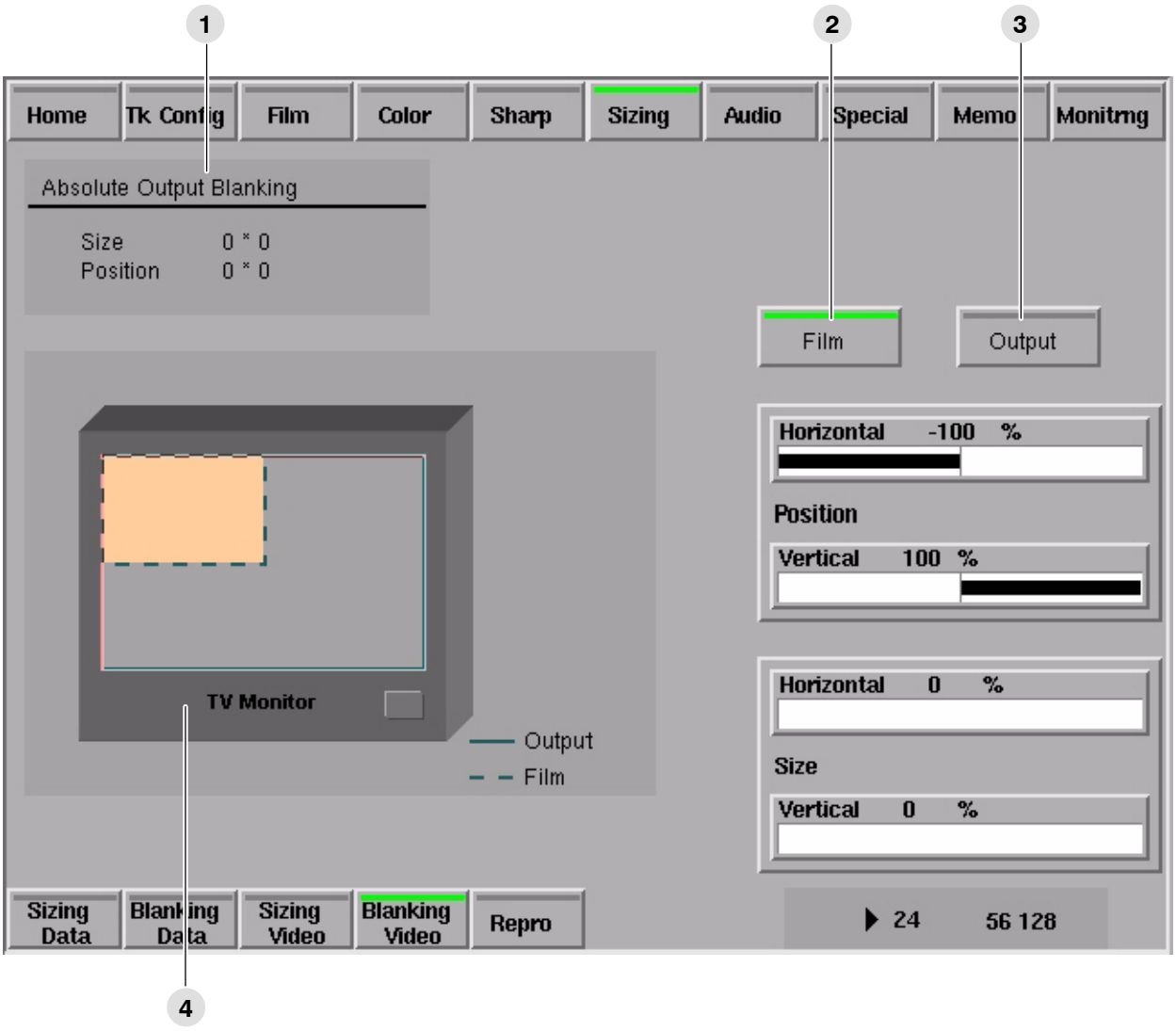


Fig. 344: Main menu **“Sizing”** / submenu **“Blanking Video”**

The main menu **“Sizing”** / submenu **“Blanking”** contains Film and TV controls. The user adjusts in this submenu the film and TV blanking or resets the blanking to standard values.

1 **Absolute TV Blanking**

It shows in numeric values the section of the output picture which is read out of the frame store in dependence on both settings, Film and TV Blanking. The upper line shows values for horizontal and vertical size, the lower line for horizontal and vertical position.

2 **Film**

Click on the "**Film**" button to delegate the digipots to Film Blanking adjustments. The Film Blanking adjustments (Size and Position) determine the section of the picture which is written into the frame store. Film Blanking becomes part of the picture (with black content). E.g. when you zoom or rotate the picture also the blanking will be zoomed or rotated.

All controls range from –100 to +100%.

To change settings, slide on the touchscreen or use the corresponding digipot control. The actual Film Blanking adjustments are displayed on the "TV Monitor" symbol.The reproduced (resulting) picture is the orange marked area (the overlapping section of the Film and the TV rectangle).

3 **TV**

Click on the "**TV**" button to delegate the digipots to TV Blanking adjustments. The TV Blanking adjustments (SIZE and POSITION) determine the section of the picture which is read out of the frame store. TV Blanking is not part of the picture, it behaves like an external Blanking rendered by a production switcher. E.g. you can zoom or rotate your picture and the TV blanking will not be affected by it.

All controls range from –100 to +100%.

To change settings, slide on the touchscreen or use the corresponding digipot control. The actual TV Blanking adjustments are displayed on the "TV Monitor" symbol. The reproduced (resulting) picture is the orange marked area (the overlapping section of the Film and the TV rectangle).

4 The actual TV Blanking adjustments are displayed on the "TV Monitor" symbol. The reproduced (resulting) picture is the orange marked area (the overlapping section of the Film and the TV rectangle).

3.7.3 SUBMENU “REPRODUCTION”

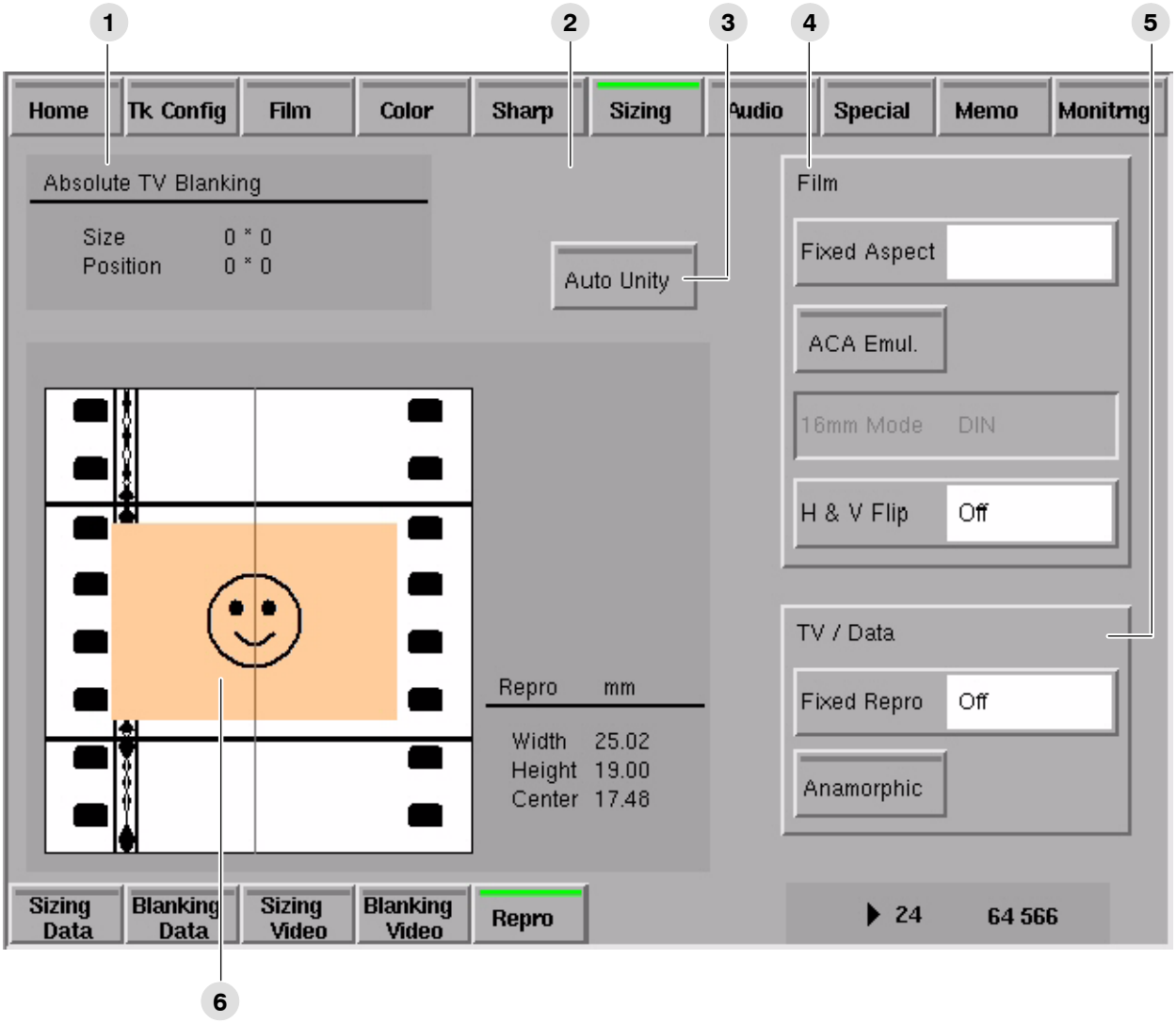


Fig. 345: Submenu **“Sizing”**

The main menu **“Sizing”** / submenu **“Reproduction”** contains scanning and reproduction settings.

NOTE!
For recommended settings refer to tables in section 2.12.5!

1 **Absolute TV Blanking**

This window shows in numeric values the section of the output picture which is read out of the frame store in dependence on both settings, Film and TV Blanking.
The upper line shows values for horizontal and vertical size, the lower line for horizontal and vertical position.

2 **Marker**

Click on the button to insert the marker into the monitor picture. **Marker** is active when the yellow bar on the button is lit. You can see the whole scanned film picture and inside the white lines your defined picture area.
To see how it works, use ZOOM for example and watch the marker lines, then switch **Marker** off again.Note that **Marker** is not available with 6 perf (Cinerama) and 8 perf (VistaVision).

3 **Auto Unity**

Selection: On, **Off**

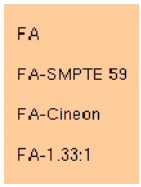
With **Auto Unity** enabled (green bar on the key is lit) you can select a new Fixed Aspect Ratio or Fixed Repro and automatically all variable settings of the Sizing and Blanking menus will be switched to unity.
In order to keep these settings after choosing a new Fixed Aspect Ratio, disable Auto Unity.

4 **Film Fixed Aspect**

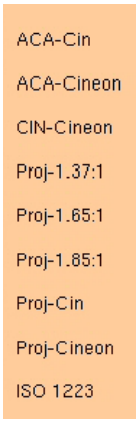
In this window diverse fixed scan settings are selectable. All these settings are strictly film related corresponding to DIN/SMPTE etc. standards.

Selection:

ACA Emul. deselected



ACA Emul. selected



Hint:
Invalid "fixed aspect" formats are displayed on the output monitor as a small horizontal picture window.

ACA Emul.
Enables to operate ACA films (Academy Camera Aperture) with super objectives (by adjusting the blanking). With COMOPT sound films, we recommend to change the appropriate film gate additionally (option). This film gate covers the COMOPT sound track.

Selection: **OFF** / ON

16mm Mode
Horizontal center correction for 16mm films.

Selection: **DIN** / ISO

"**DIN**"	horizontal center correction in conformity with DIN 1602, part 7 and ISO DIS 5768 standard
"ISO"	horizontal center correction in conformity with ISO 5768 (1981)

H&V Flip
Click on this button and make your choice from the drop-down menu.

Four selections are available:

Off:	no effect,
H Only:	the picture is flipped horizontally. This is useful in case the film has been laced up in the wrong sense.
V Only:	the picture is flipped upside down. Apart from creative aspects, this function can be used in case the reel has been laced up at the end.
Both	flips the picture in both senses: horizontal and vertical. Shifts the output picture horizontally or vertically by +/- 100%.

5 **TV / Data**
Repro makes the picture fit the monitor format (4:3 or 16:9). This is achieved by zooming in what implies horizontal or vertical losses of picture information.
The selectable reproduction formats are depended on "Fixed Aspect" film type selection:

Off	The picture is reproduced according to the selected aspect ratio.
4:3	The picture is reproduced in 1.33:1 ratio which means full format on a 4:3 monitor.
16:9	The picture is reproduced in 1.78:1 ratio which means full format on a 16:9 monitor.
CINEON	The picture is reproduced in 1.316:1 ratio for SMPTE 59 style C film format.
1.85:1	has two meanings: for video the picture is reproduced in 1.85:1 ratio which is a TV compromise format for Cinemascope (loosing picture information on both sides in exchange for smaller letterbox bars).
2.39:1	The picture is reproduced in 2.39:1 ratio for SMPTE 96M film format.

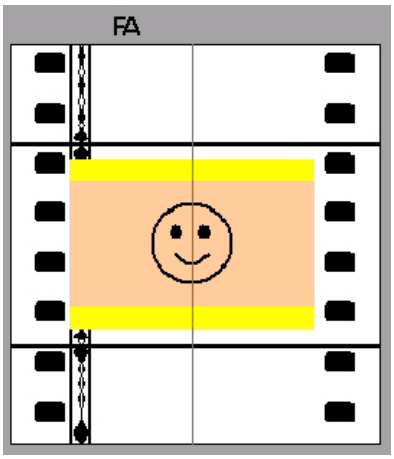
Anamorphic
The Anamorphic CinemaScope process, is a lens that condenses the width of an image, squeezes the image during filming and then expands it during projection to create a widescreen effect.

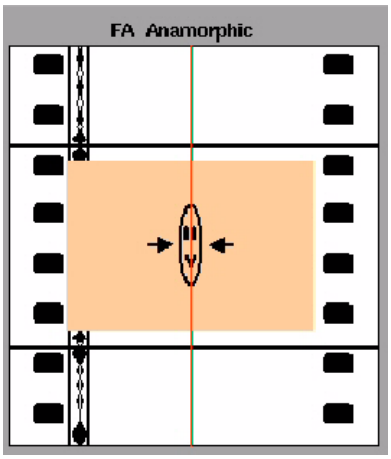
Sizing format enables cinemascope (anamorphic) reproduction of the film frame.

Selection: **OFF** / ON

6 **Display of the scanned and reproduced area**

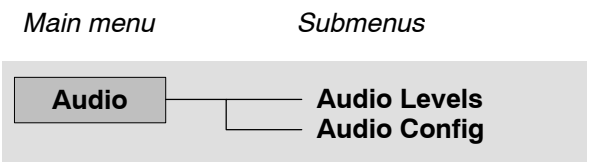
This depends on the following settings:
Fixed Aspect, ACA Emulation, Fixed Repro, Anamorphic, Film Perforation, and Film Format (35, 16 or 8 mm).





The scanning range is displayed by an coloured rectangle. The chosen “Fixed Aspect” setting is displayed above the film picture. The non-reproduced areas are yellow coloured.
The smiley in the center of picture indicates whether the picture is projected uncompressed, compressed (Anamorphic = Cinemascope) or rotated (8 perf films).

3.8 AUDIO MENU (OPTION – IN PREPARATION)



3.8.1 SUBMENU “AUDIO LEVELS”

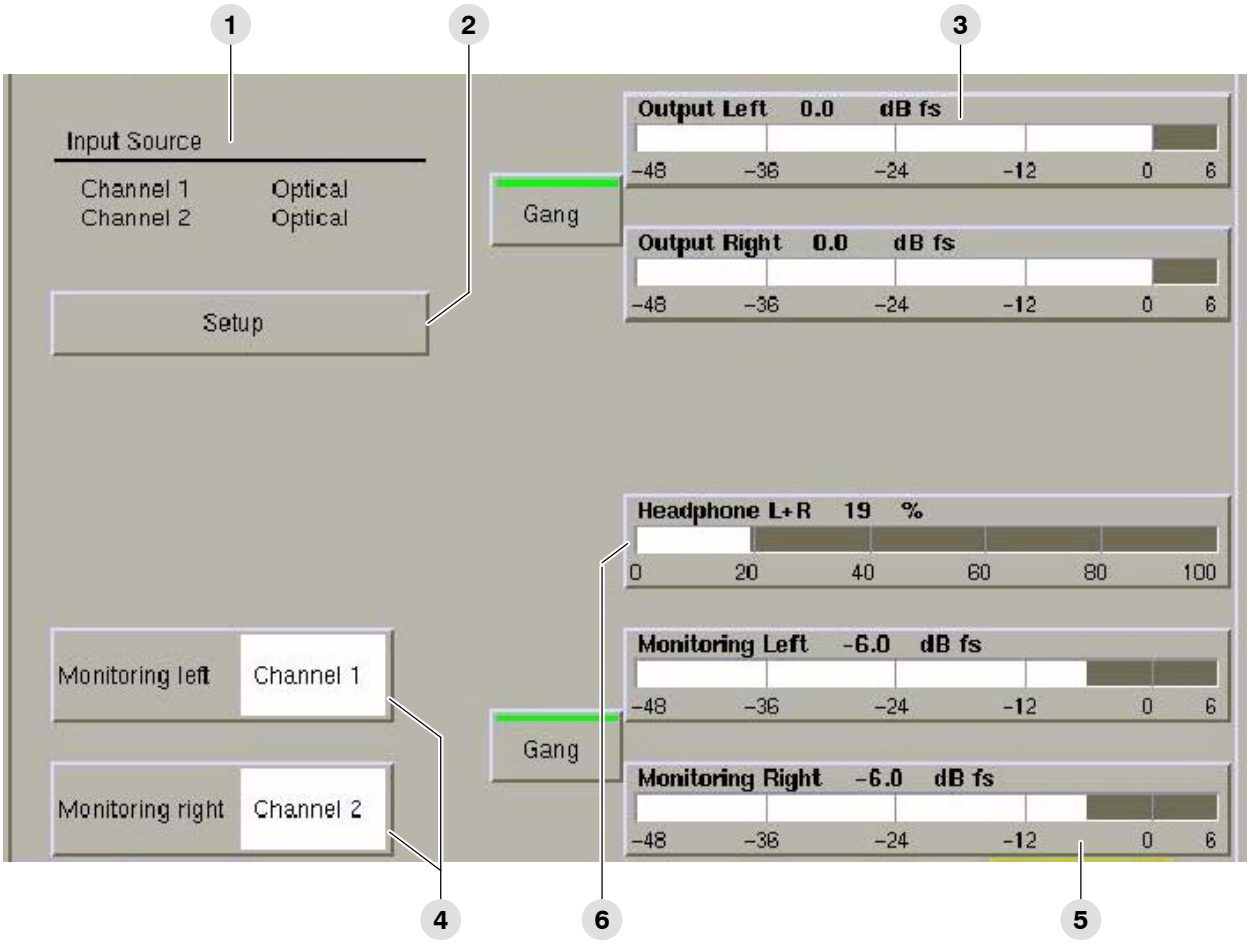


Fig. 346: Submenu Audio Levels

Submenu Audio Levels covers all sorts of Audio reproduction levels.

1 **Input Source**

The signal sources for the two audio channels shown on this display are selected in main menu ”Audio Config.”

Display channel 1
with following signal sources: **magnetical, optical, ext 1, test, off**

Display channel 2
with following signal sources: **optical, ext 1, test, off**

2 **Setup Studio Level**

The studio level shows the output level in dBu which corresponds to a level of 0 VU in the film scanner.
It is possible to select studio levels of **–3 dBu, 0 dBu, 4 dBu** and **8 dBu**.Click on the Studio Level button and make your choice from the drop-down menu.

Setup Channel 1/2 Balanced and unbalanced
With the studio levels of 4 dBu and 8 dBu, the Audio output final stage is switched to floating mode if the load is unbalanced. With this, the output level is reduced by 6 dB.

At –3 dBu and 0 dBu, the output is always floating.

Setup Monitor
This function key has the same function as setup Channel 1/2, but applies to the monitor outputs.

Setup Dolby
This function key has the same function as Setup Channel 1/2, but applies to the monitor outputs.

3 **Audio Output Level Control**

These keys control the Audio Output Level for the left and right channel. To modify, slide on the touchscreen or use the digipot control.

Audio range is from **–48 dB fs** to **+6 dB fs** (fs = full scale).

A level meter shows the current level and a peak value of your current program sound.

4 **Monitoring Selection**

For Monitoring left and Monitoring right, four selections are possible:

Off, Channel 1, Channel 2, Both. The display refers to the two monitor output sockets MONITOR OUT L & R .

Click on the button and make your choice from the drop-down menu.

5 **Monitoring Attenuator**

These keys control the Monitor output level for the left and right channels.
To modify, slide on the touchscreen or use the digipot control.
To adjust left right together switch the Gang button.
The range is from **-48dB** to **+6dB**.

The current settings are shown on the key displays.

Note that **AUDIO is an option** on your Film Scanner!

6 **Headphone Attenuator**

This key controls the headphone output level.
To modify, slide on the touchscreen or use the digipot control.
The range is from **0 to 100%**.

The current setting is shown on the key display.

3.8.2 SUBMENU “AUDIO CONFIG”

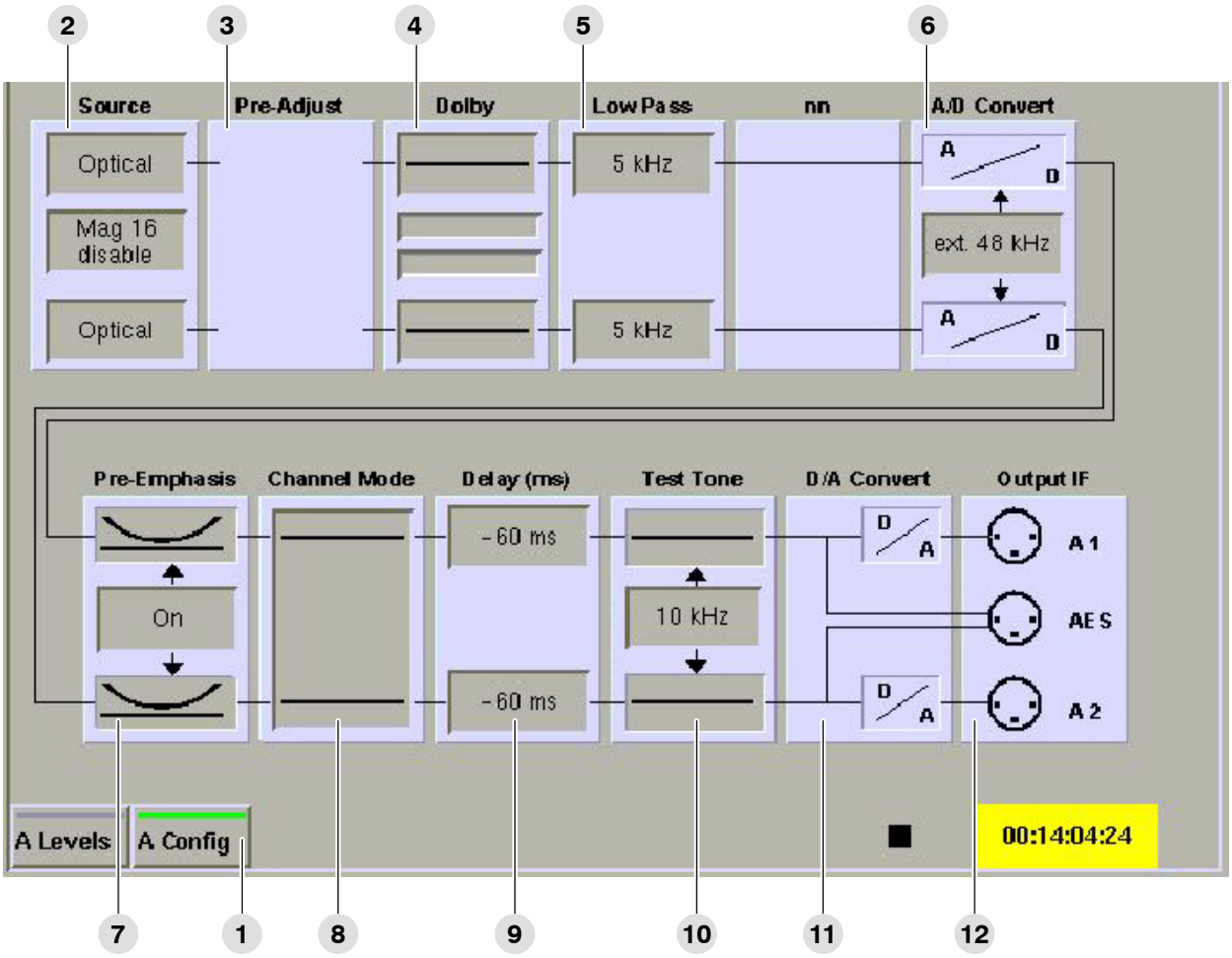


Fig. 347: Audio configuration menu

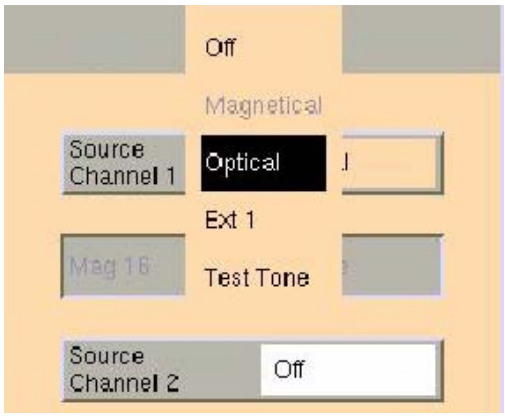
Submenu ”Audio Config” is selected by pressing dialog key ”Audio Config” on the GCP. This main menu serves to set the configuration of the two audio channels. The channels 1 and 2 form a channel pair.

The Telecine has two digital audio channels which can be used at the output alternatively in an analog or digital form. The digital audio interface ”AES” corresponds to the AES/EBU standard.

AES/EBU audio data format
A block of the digital audio output signal consists of 192 audio frames.
The audio frame consists of the subframes A and B with 32 bits each (1 audio frame = 20.83 µ s).

1 **A Config** opens dialog **"Audio Configuration"**

2 **"Channel 1 / 2 source" selection**
Click on this section to open the Source selection window.



There you will find a Source Selection button for each channel.
Click on these buttons and make your choice from the drop down menu.

The selections for Channels 1 and 2 are different:
Channel 1 can be switched to Off, Magnetical (only for 16mm films), Optical,

Ext 1 and Test Tone;
Channel 2 can be switched to Off, Optical, Ext 2 and Test Tone.The current settings are shown on the key display.

"Off"	Optional muting of an audio channel that is not needed.
"Magnetical"	Selection of magnetical audio for 16mm films.
"Optical"	Selection optical audio for 16mm and 35mm films.
"External 1"	Selection of an external audio source via socket EXT. 1 IN.
"Test"	Internally, digitally produced sine wave tone (1 kHz/10 kHz, 0 VU) for test purposes.

Audio Scanner 1 - COMMAG 16 - can be released

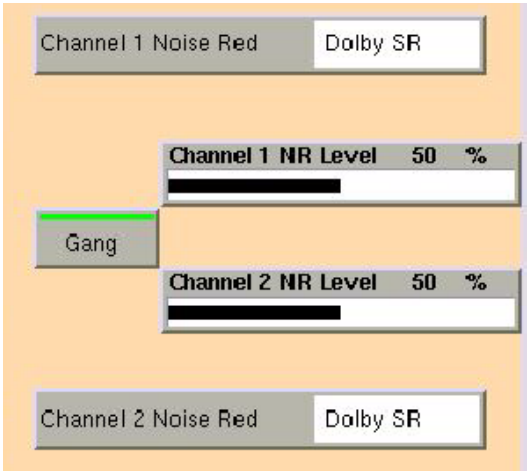
disable	Audio Scanner will be lifted up, audio track will not be scanned
enable	Audio Scanner 1 will be released, ready for operation

3 **Pre Adjust**
Note! Adjustments for service personnel only.

This window serves to adjust the film audio input levels and the input equalizers.

4 **Dolby**

Click on this section to open the Dolby selection window.



There you will find a Dolby selection key and a Dolby Level control for each channel.

Click on the buttons and make your choice from the drop down menu.

The actual choice is between **None** and **Dolby SR**. Dolby A is not selectable.

Dolby SR (Spectral recording) refers to an external decoder unit as there is no internal decoder.

Channel 1/2 Noise Red Level control is used to adjust the Dolby output level. Switch on the Dolby test tone of your external device and compare the deflection (see level meter) with what is coming out when you play the Dolby test tone section of your film copy. Adjust this level until it shows the same reading as the test tone coming from the decoder unit.
To adjust, slide on the touchscreen or use the digipot control (the range is from 0 to 100%).
The current settings are shown on the button displays.

5 **Low Pass**

This pull down menu serves to switch on or off lowpass filters in the respective audio channel depending on the film sound. The two lowpass filters attenuate higher frequencies from 5 kHz.
Selection of the lowpass filter for audio channel 1.

The following adjustments are possible:

”Flat (standard setting)”
Film audio channel is not filtered.
Use with good film sound quality.

”5kHz”
Film audio channel is filtered.
Use with bad film sound quality.

6 **A/D Convert**

This pull down menu serves to internally or externally lock the audio A/D converter. The following adjustments are possible:

"Internal Video"

Locking internally.
Locking of the audio A/D converters is made on the internal video signal (standard setting).

"External 48 kHz"

Locking externally.
Use when playing the film sound into an external digital audio studio which is clocked with 48 kHz.

7 **Audio Pre-emphasis**

This pull down menu serves to set the preemphasis for both audio input signals (preemphasis: peaking of frequency components before A/D conversion, for improving the signal-to-noise ratio).
In the digital AES signal, only a preemphasis information is entered in the channel status. In the analog signal, the frequency response is equalized after D/A conversion in the output stage.

The following adjustments are possible:

"Off" No preemphasis

"On" Switching on the CD-type preemphasis (EQ time constant: 50/15 μ s).

8 **Channel mode**

This pull down menu serves to define mono or stereo mode (two-Channel). The following adjustments are possible:

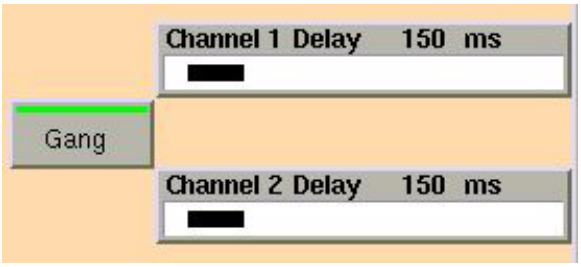
"Mono"
One channel operation (only subframe A in the digital signal used)
16mm films have always mono audio tracks. 35mm films may have mono or stereo audio tracks depending on the type.
If a stereo film has to be played in mono mode, both channels are mixed with each other, their levels automatically adapted and distributed to the two audio channels.
Mono mode should only be used with stereo signal sources selected (e.g. OPT1 and OPT2 in case of 35mm stereo film or EXT1 and EXT2 in case of external stereo devices). With one input switched to OFF (not connected), mono mode is not applicable, i.e. channel routing changes to two-channel mode.

“2 channel (stereo)“
2-channel operation with following allocation of the channels.

DIGITAL AES/EBU OUT	Channel one Subframe A
ANALOG AUDIO 1 OUT	Channel one (Left channel with stereo sources)
ANALOG AUDIO 2 OUT	Channel two (Right channel with stereo sources)

If a mono film is played in the two--channel mode, the 2nd channel can be used for instance with an external SEPMAG signal via ”External 1, 2”.

9 **Audio Delay**
Click on this section to open the Audio Delay window.



The audio delays which are adjustable in this window compensate picture signal processing time caused by external devices (such as secondary color correctors, noise reducers, etc.).The range is from **–60 to +1000 ms** in steps of 10 ms.
Internal audio delays, different for each film format (in dependence on the pitch between picture and audio scanners), are corrected automatically by the Datacine.To adjust the delays, slide on the touchscreen or use the corresponding digipot controls.

To exit the window, click on the Close button.

10 **Test Tone**
Click on this section to open the Test Tone window.

There are 2 different audio test signals available:
1 kHz (standard setting) and **10 kHz.**This feature can be used for quick check of all involved audio components. To select, click on the corresponding key.The current setting is shown on the key display. To exit the window, click on the Close button.

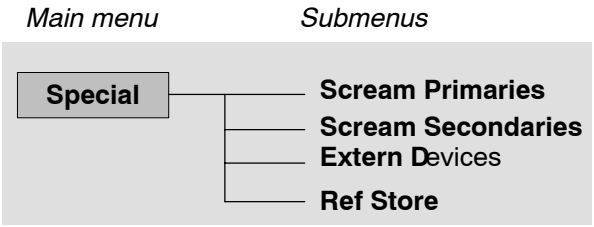
11 **D/A" Convert**

Symbolized the position of digital to analog conversion.

12 **Audio Outputs**

Symbolized the Audio outputs sockets of terminal panel Rack1.
Two analog and one digital (AES/EBU) outputs.

3.9 SPECIAL MENU



The Scream 4K/2K is operated in the GCP GUI under main menu **Special**.

3.9.1 SUBMENU “SCREAM 4K/2K”

Scream 4K/2K is an optional board which has to be fitted in rack 2, slot 6!

Menu button **“Scream Primaries”** (placed in the lower left corner) opens dialog **“Scream 4K - Grain Reducer”**

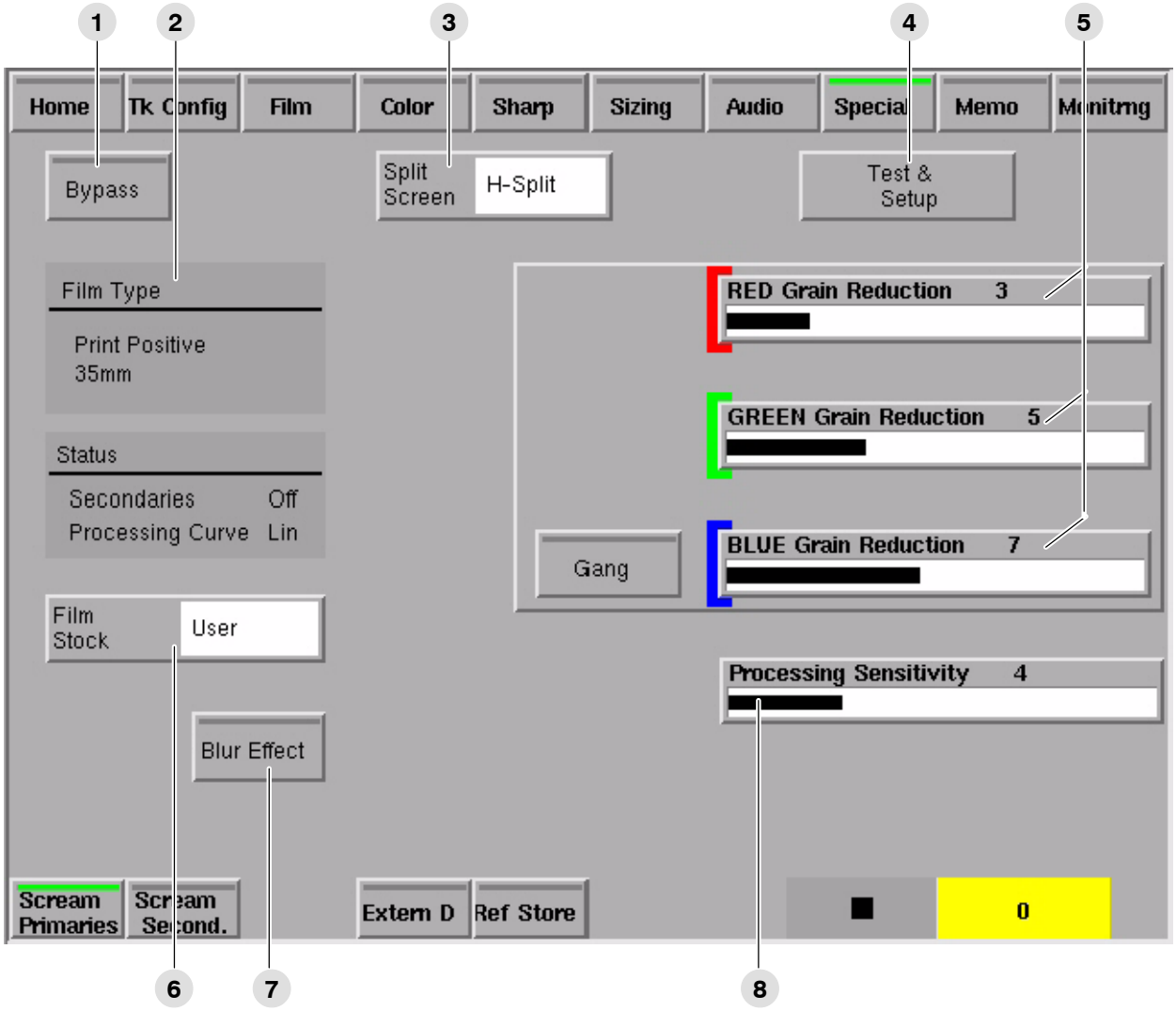


Fig. 348: Menu Scream Primaries

The grain reduction functionality of SCREAM is only available in play mode, not in stop mode. The SCREAM is a resolution and format independent grain reducer.

1 Bypass

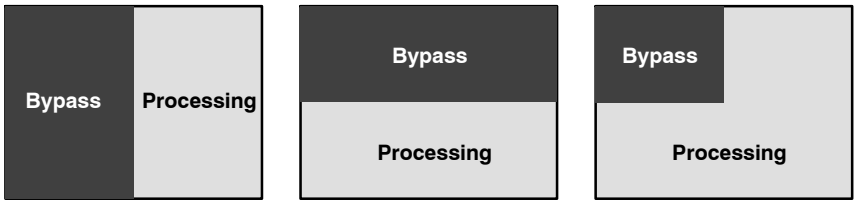
If you want to be sure to look at a picture which is not affected by the SCREAM, click on the **Bypass** button. Bypass is enabled when the bar on the key is yellow.

2 Film Type Display

Informs about the film material currently laced up on your telecine.

3 Split Screen

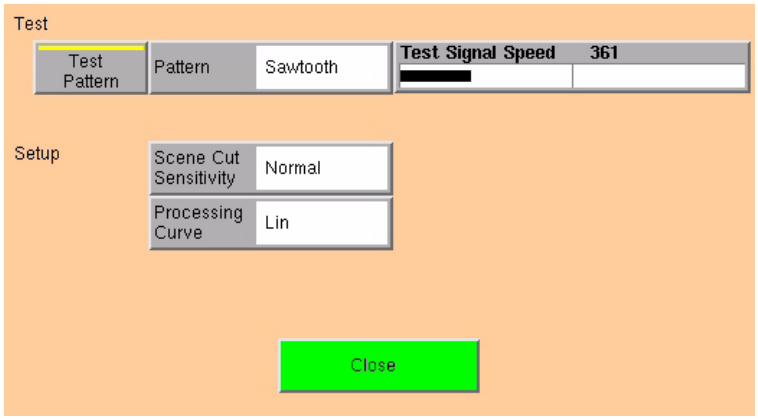
A horizontal (H-Spilt), vertical (V-Split) or quarter (Q-Split) screen split can be activated with this button. This function is a tool to compare the filtered part of the picture with the non-filtered part. Click on the button and make your choice from the drop-down menu. Of course your choice will depend on picture content. The current setting is shown on the key display.



H-Split **V-Split** **Q-Split**

4 **Test & Setup**

Selecting the button opens a new dialog:



When **Test Pattern** is enabled, the yellow bar on the key is lit. By pressing the adjacent **Pattern** Key, a drop-down menu opens containing all available test patterns (**Color Bars**, **Multiburst**, **Black** and **Sawtooth**).
To select a pattern, click on it. The current selection is shown on the key display. If it reads ”TK Pattern”, a telecine test pattern is active.
This standard test signals are for service purposes and should be used by qualified service personnel only:

Color Bars	used to check if all color channels are present
Multiburst	used to check the frequency response of the processing chain
Black	used to check if the black level remains constant in the processing chain
Sawtooth	used to check the linearity of the system and if all bits are present
Sawtooth speed	used to emulate moving image content to check if the temporal filters are working

Test signal speed is only available in conjunction with the **Sawtooth** pattern. It controls the horizontal movement of the Sawtooth pattern. To change the speed, slide on the touchscreen or use the digipot control.

Scene Cut Sensitivity
With this key, the sensitivity of the built-in scene change detector can be modified. The standard setting is “**Normal**”**.** In case the film material you are working with consists in a number of scenes which hardly vary, it is recommended to switch the sensibility to “**High**”**.** In this case even small changes in picture content will be considered. When ”taking” old print films with flicker and jumping transitions rather choose “**Low**” to avoid events where there are not any.
To change, click on the key and choose from the drop-down menu. The current setting is shown on the key display.

Hints for the operator:
The built-in scene change detector serves for two purposes. First, to clear the Recursive Filter at the beginning of a new scene in order to avoid “after images” from the previous scene. Secondly it supports the automatic generation of event lists which can be worked upon in the GCP’s EVL option (refer to section 3.12 “EDL List”).

Processing Curve
This switch allows the Scream 4K to perform grain reduction in either the linear or the logarithmic (film density related) domain. By default the **Processing Curve** is set to "**Log**". It is recommended to use the "**Lin**" mode only in case of the Spirit output characteristic is set to linear.
In video mode the TV output characteristic (LUT) is adjusted in the menu Color / Col Set (refer section 3.5.3). In data mode the transfer characteristic is adjusted under menu TK Config / Data (refer section 3.3.4)

5 Grain Reduction and Gang

The RGB sliders form a new feature for even more specific grain reduction. The strength of grain reduction can be set here individually for each color channel. The range is from 0 to 15 in steps of one. To modify, slide on the touchscreen or use the soft pot control.
The current setting is displayed as a bar graph with the corresponding values on top. There may be need for such specific settings as film material consists of layers containing silver halogenous grains sensitive for red, green and blue light.
Later on they react with the corresponding dyes (yellow, cyan and magenta) to create a colored picture.
Different layers may respond in different ways to sensibilization, exposure and processing and therefore the impression of granularity may differ from one layer to another.

With the SCREAM 4K there is no need for grain filter type selection (Transversal, Recursive, etc.). According to the filter strength setting of the RGB channels, grain filter selection is automatically performed.

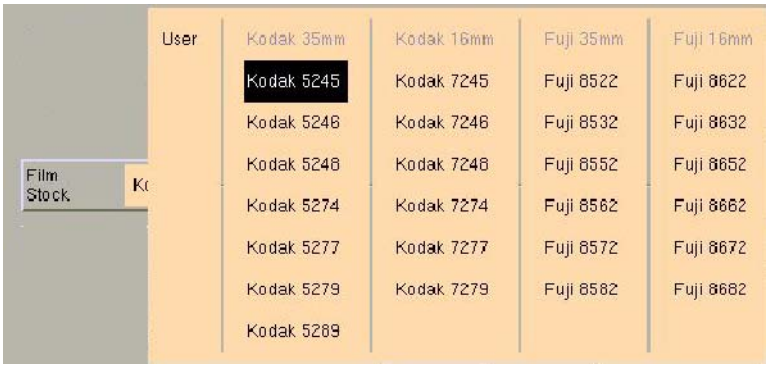
TRANSVERSAL FILTER (roughly) works according to the following method:
The output pixel is averaged (median value) from the same pixels of three successive pictures and the vertically adjacent pixels of the center frame.
This filter works with a constant quality, no matter how far away from a scene change event.

RECURSIVE FILTER (roughly) works according to the following method:
The averaging of the output pixel here is a process, involving pixels of all preceding pictures after the last scene change up to the current frame.
The output pixel averages the current pixel with the same, already averaged pixel of the previous picture which itself already is the average of the previous recursion.
That is why this filter of course works much stronger than the Transversal Filter (be careful: in some cases maybe even too aggressive for your desired application) but with increasing effect the further you get from the last scene change.

Gang
This button concertedly controls a group of keys. With **Gang** activated (green bar on the key is lit) the strength parameter slider of grain reduction in all three channels (RGB) is modified by touching only one of the controls.

6 Film Stock

The **Film Stock** menu enables to select different film stocks of Kodak and Fuji for 35mm films and 16mm films. Each film stock has different granularity



characteristics in the different dye layers and requires a relative weighting of the amount of grain reduction applied to the 3 channels.
The Scream has these adjustments preprogrammed for the most popular film types. Film grain reduction is automatically adjusted for all 3 channels and can subsequently also manually be changed.
This is particularly useful for blue or green screen transfers where a higher degree of grain reduction may be desirable in the background key colors (blue of green).

7 Blur Effect

If this button is enabled, indicated by a yellow bar, the internal motion detector is switched off.
This feature should not be used in standard operation as it causes smearing artefacts at moving objects in the image and is therefore exclusively to be applied for artistic effects. In case of no movement in the picture (e.g. packshot) **Blur** can be applied to achieve a high performance filtering.

8 Processing Sensitivity

The grain threshold for the filtering process can be modified with the **Processing Sensitivity** slider ranging from 0 ... 15. Zero stands for very low grain input material where little grain filtering is required. If the grain in the input source gets higher, the processing sensitivity has to be set higher in order to raise the motion threshold and thus to enable grain reduction. If the processing sensitivity is set to maximum even extremely noisy film can be processed.
However, be careful with high settings, as motion artifacts may occur!

Hints for the operator:
To adjust the processing sensitivity it is recommended to set processing sensitivity to maximum first, and then select the desired amount of grain reduction. In the second step the processing sensitivity should be reduced as much as possible without loosing grain reduction in non-moving parts of the picture. Thus the motion threshold is adjusted right above the "grain floor" in order to achieve the best trade off between grain reduction and motion artifacts.

3.9.2 SUBMENU “SCREAM SECONDARIES”

The **Scream Secondaries** dialog is opened with the second button in the lower left corner. It serves for either enhance (boost +3 / +6 dB) or reduce (cut –3 / –6 dB) grain reduction in selected areas of the image.

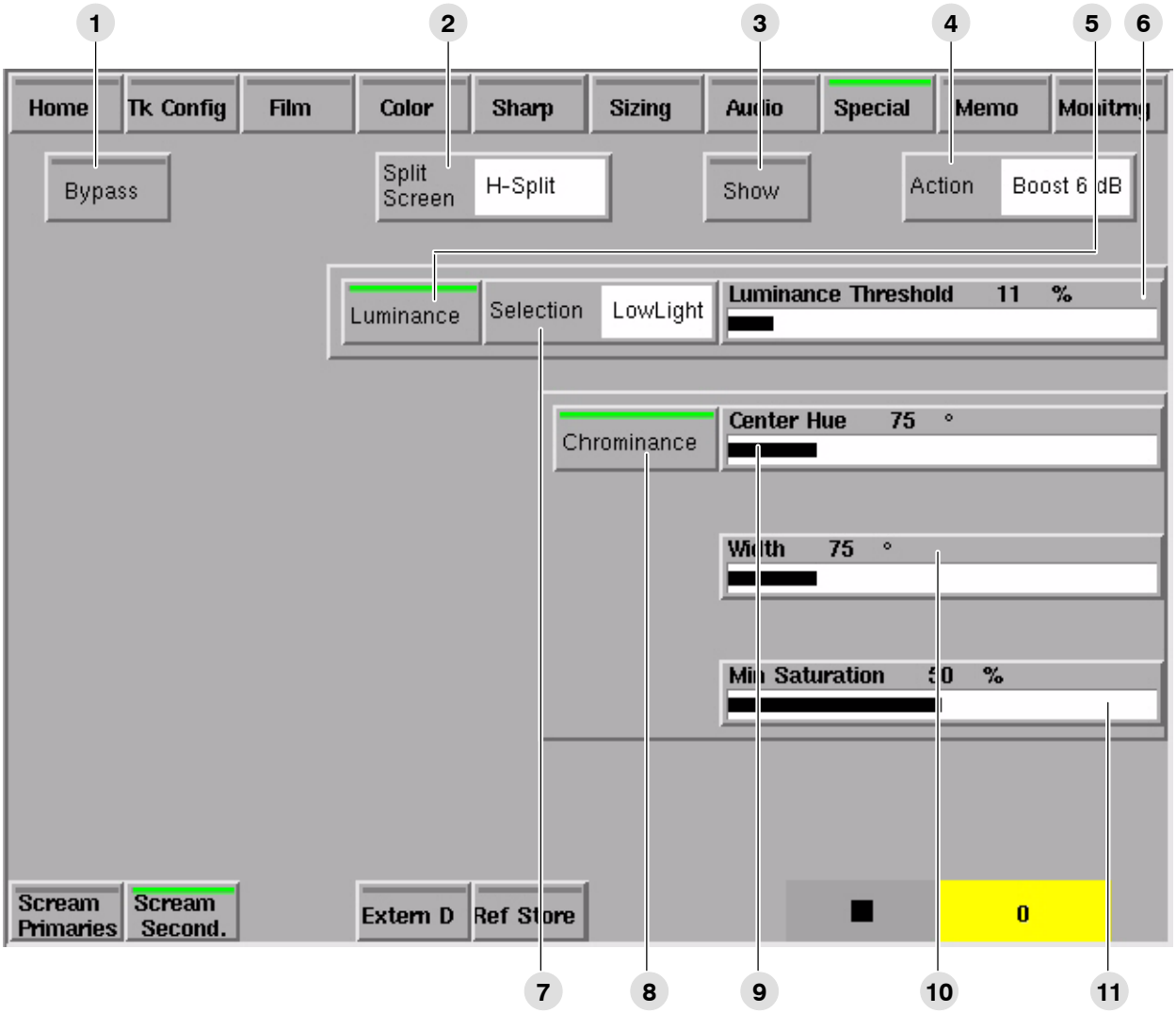


Fig. 349: Menu Scream Second

1 Bypass

If you want to be sure to look at a picture which is not affected by the SCREAM, click on the **Bypass** button. Bypass is enabled when the bar on the key is yellow.

2 Split Screen

A horizontal (H-Spilt), vertical (V-Split) or quarter (Q–Split) screen split can be activated with this button. This function is a tool to compare the filtered part of the picture with the non-filtered part. Click on the button and make your choice from the drop-down menu. Of course your choice will depend on picture content. The current setting is shown on the key display.

3 **Show**

If **Show** is active the selected image area is displayed in grey.

4 **Action**

With **Action CutBoost** grain reduction is enhanced or reduced within selected (qualified) picture areas**.** Four settings can be chosen from the drop-down menu: **Boost 6dB**, **Boost 3dB**, **Cut 3dB**, **Cut 6dB**.
A qualification for Luminance and Chrominance can be made at the same time.

5 **Luminance**

Selects Luminance in order to make a qualification based on picture brightness.

6 **Luminance Threshold**

The Luminance threshold is adjustable between 0% (black level) and 100% (white level).

7 **Selection**

Selects between **Low Light** or **High Light**, depending on whether dark parts or bright parts of the image shall be affected by Cut Boost Action.
In case **Low Light** is selected picture content between black level and the adjusted luminance threshold is affected. In case **High Light** is selected picture content between the adjusted luminance threshold and white level is affected.

8 **Chrominance**

Selects Chrominance in order to make a qualification based on picture hue.

9 **Center Hue**

Center Hue picks up a specific color in the U/V plane to be cut or boosted.
The range for **Center Hue** is 0 ... 360°

10 **Width**

Width specifies a certain color range around the Center Hue value.
The range for Width is 0 ... 360°

11 **Min Saturation**

Min Saturation can be used to exclude grey areas from being selected.

3.9.3 SUBMENU “EXTERN D”

Menu button **“Extern D”** opens dialog **“Extern Devices”**

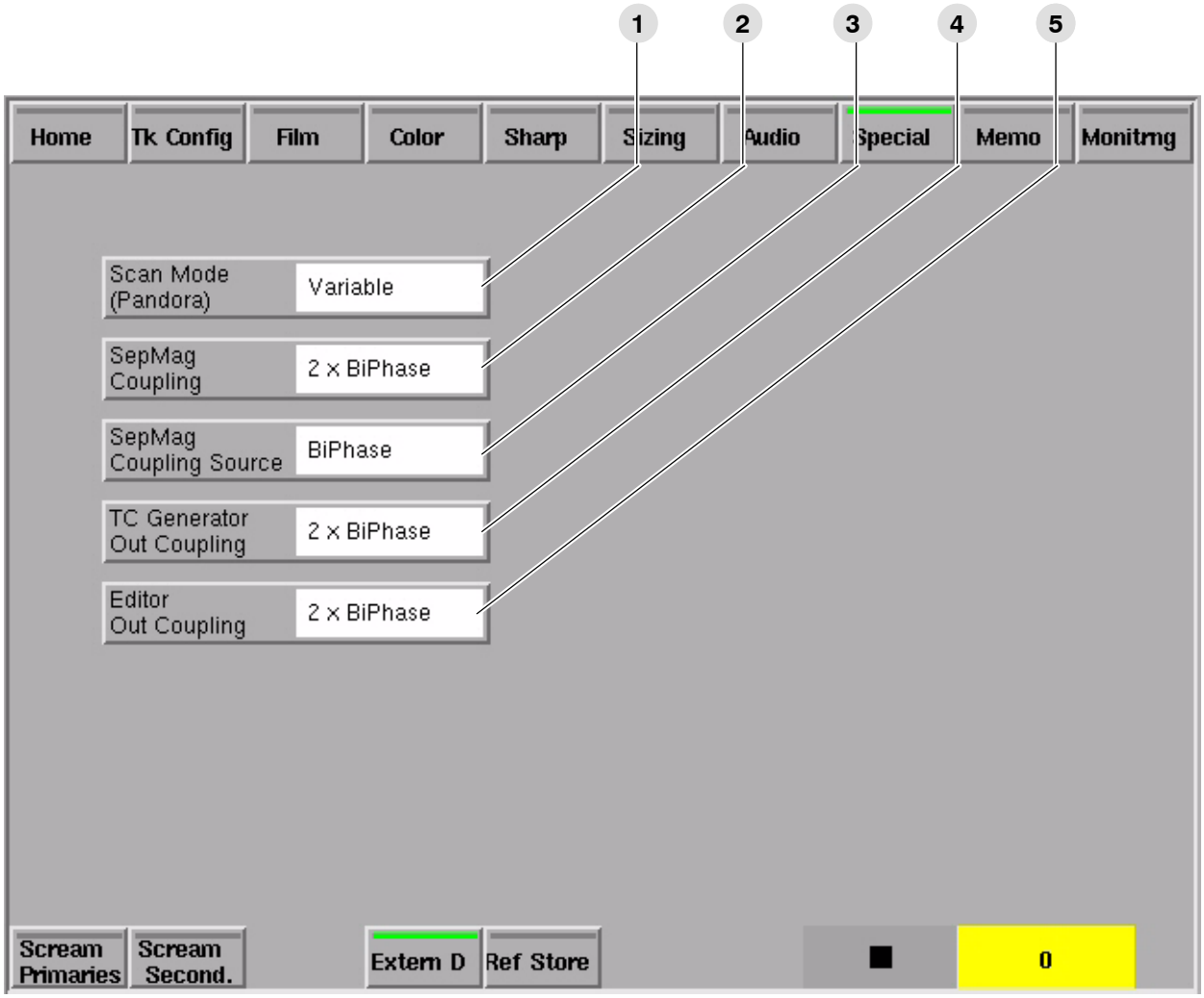


Fig. 350: Submenu “Extern D”

This menu contains various setups which are needed in combination with external devices.

1 Biphase signals are generated internally by dividing down pulses coming from the sprocket wheel.

Here the Biphase signal is used to synchronize external SepMag units. It can be switched between **2x Biphase** (48/50Hz), **10x Biphase** (240/250Hz) and **1x Biphase** (24/25Hz), referring to the SEPMAG OUT connector of Rack 2.

To find out the correct setting, check manual of connected device. To modify, click on the key and select from the drop down menu. The current setting is shown on the key display.

2 SepMag players can either be synchronized on **BiPhase** or **Timecode** signals generated by the DataCine.

Audio Delay is set to 'Zero' in case a SepMag player is coupled via Timecode with the DataCine and the audio outputs from the player are connected to "Audio In" of the SDC.
The audio output of the DataCine then has a correct timing to the video signal. To modify, click on the key and select from the drop down menu. The current setting is shown on the key display.

3 Biphase signals are generated internally by dividing down pulses coming from the sprocket wheel.

Here the Biphase signal is used to synchronize external time code units (e.g. keycode reader).
It can be switched between **2x Biphase** (48/50Hz), **10x Biphase** (240/250Hz) and **1x Biphase** (24/25Hz), referring to the TC GEN OUT connector of Rack 2.
To find out the correct setting, check manual of connected device. To modify, click on the key and select from the drop down menu. The current setting is shown on the key display.

4 Biphase signals are generated internally by dividing down pulses coming from the sprocket wheel.

Here the Biphase signal is used to synchronize external editor units (e.g. Pogle). It can be switched between **2x Biphase** (48/50Hz), **10x Biphase** (240/250Hz) and **1x Biphase** (24/25Hz), referring to the Editor Out connector of Rack 2.
To find out the correct setting, check manual of connected device.
To modify, click on the key and select from the drop down menu.
The current setting is shown on the key display.

5 Biphase signals are generated internally by dividing down pulses coming from the sprocket wheel. Here the Biphase signal is used to synchronize external editor units (e.g. Pogle). It can be switched between **2x Biphase** (48/50Hz), **10x Biphase** (240/250Hz) and **1x Biphase** (24/25Hz), referring to the Editor Out connector of Rack 2. To find out the correct setting, check manual of connected device. To modify, click on the key and select from the drop down menu. The current setting is shown on the key display.

3.9.4 SUBMENU “REF STORE”

[The following section is intended for SDC 4000 / SDC 2048 DataCine only!]

The **Ref Store** dialog is opened with the button in the lower left corner.

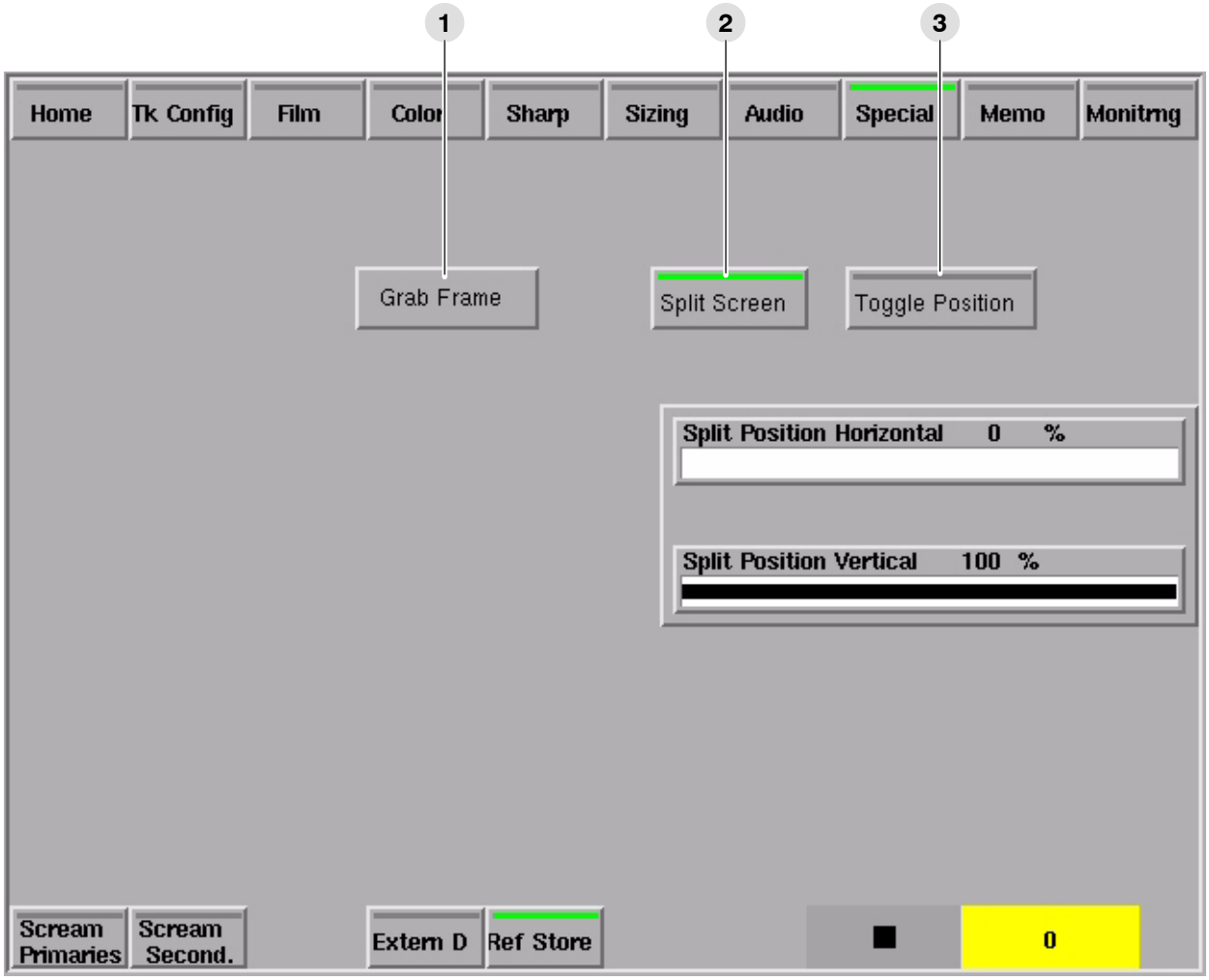


Fig. 351: Submenu Ref Store

Submenu **Ref Store** allows to store a scanned image in a reference store. This image can be a film, data or television frame in HD or standard definition resolution.

Splitted Screen
with H & V wipe of the
reference stored image

Fig. 352: Split screen

The operator can wipe horizontally and vertically between the stored reference frame and the live frame for color matching.

Select a defined image in STEP mode and store this into the reference buffer by pressing the button 'Grab Frame'. This function is not programmable via an external editor.

1. Grab Frame serves to store a film frame into the refence store
2. Split Screen serves to provide a two image presentation in one frame
3. Toggle Position

1 **Grab Frame**

Press the button **Grab Frame** to store a scanned frame. It is visible at the appropriate outputs HDTV or SDTV alternatively at the Data Out.

2 **Split Screen**

Button **Split Screen** activates the two frames presentation depending from the horizontal and vertical Split Position sliders.

Split Position Horizontal & Vertical

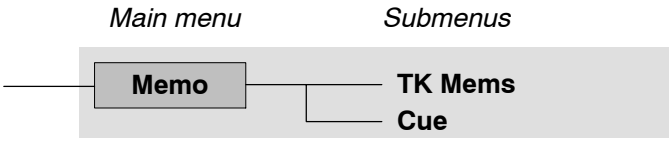
Adjust the horizontal and vertical wipe. To modify, slide on the touch screen or use the corresponding digipot control.

Restrictions!
In some "image sizes", the film frame (grabbed or current scanned image - depending of the toggle position) does not achieve 100% "split position".

3 **Toggle Position**

exchanges the stored frame with the actual frame.

3.10 MENU MEMO



3.10.1 SUBMENU “TK MEMS”

TK memories are permanent storages for TK settings. The submenu **“TK Mems”** serves to store Film Scanner settings. Each user can store up to 165 settings (see “Table of Stored TK-Mem Parameter” below. The GCP file system allows as many users as you like.

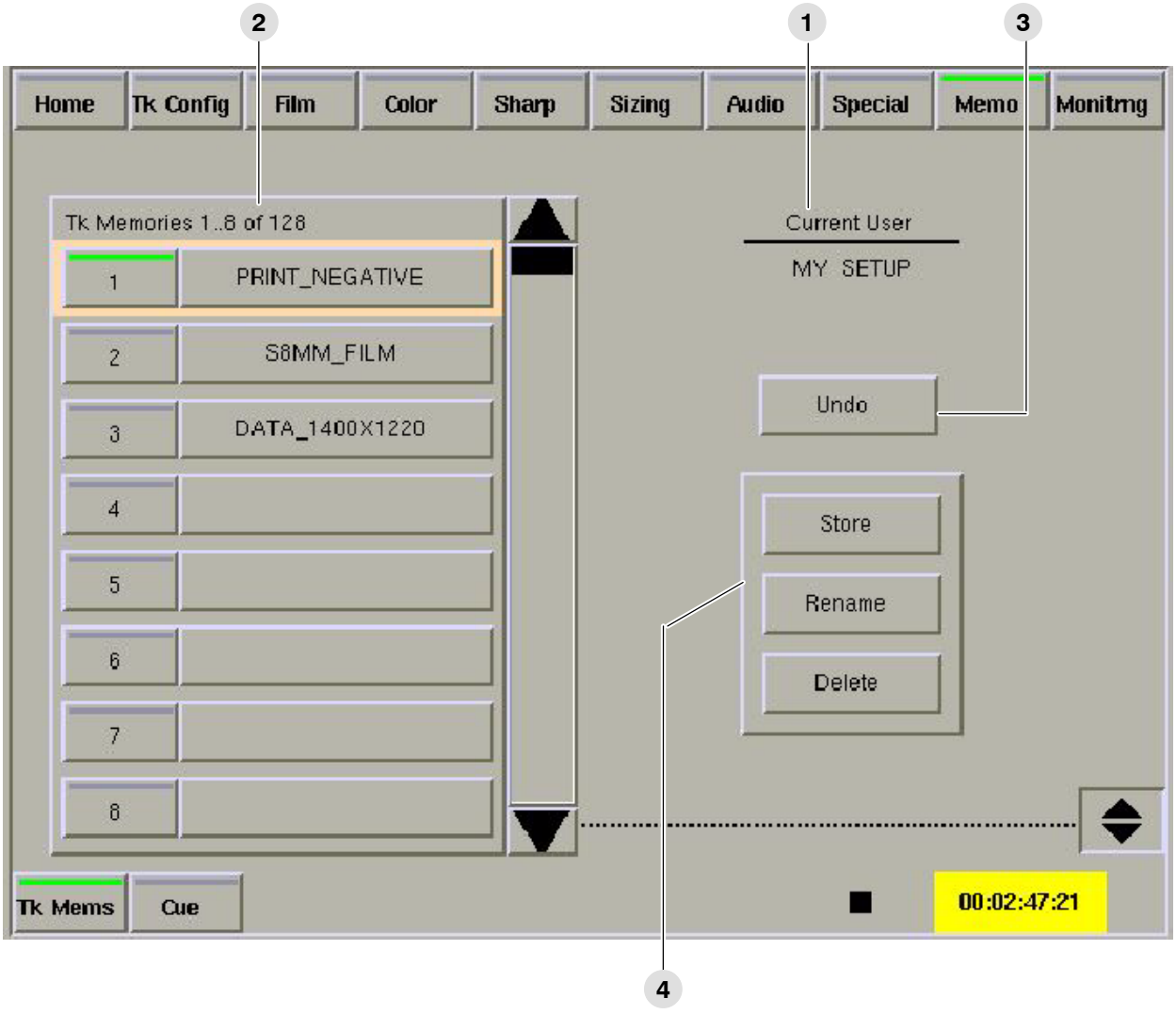


Fig. 353: Submenu **”TK Mems”**

1 **Current User**

This window shows the current user of the **TK Mems**.
The user can be defined and selected in the login menu.

Press the **"On"** button to open the login menu.

Actuate the **User** button in the **Login** menu.

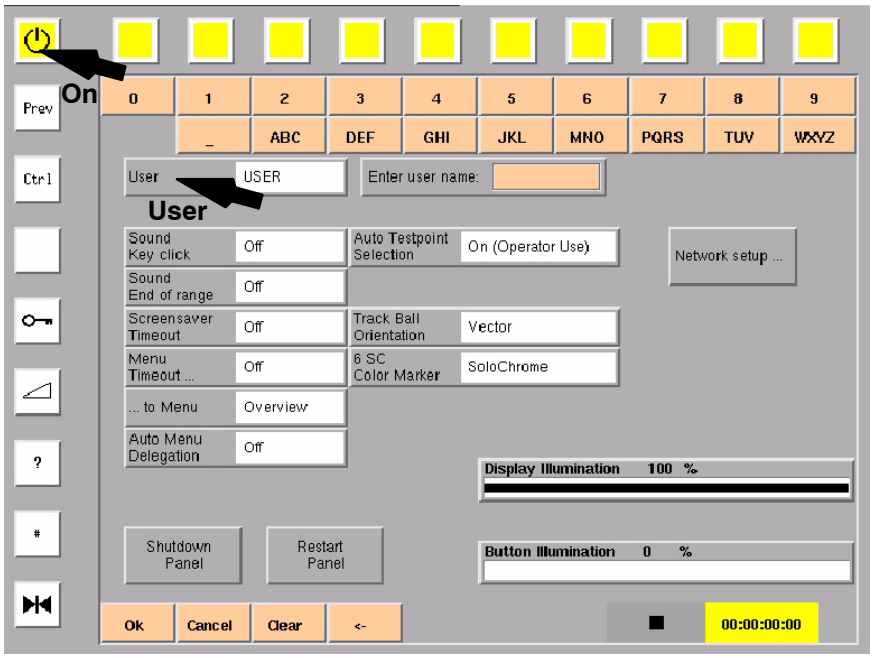


Fig. 354: Submenu **"Current User"**

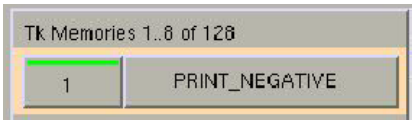
To select or set a new user make the corresponding choice (new user, delete user, Factory reset).

A two lined keyboard and the concerning action buttons will be opened.

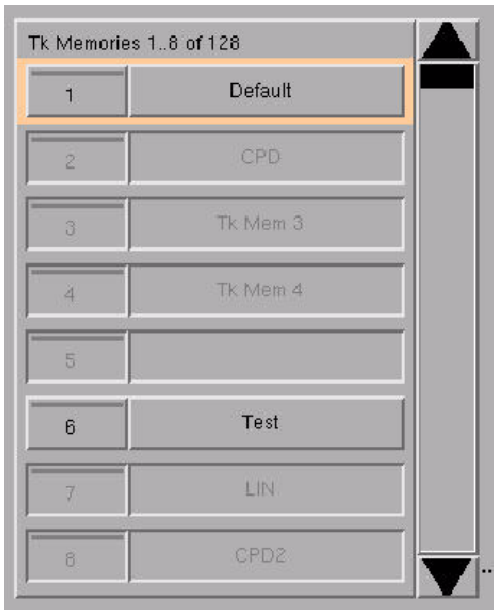
Type in the name for the new user and confirm by pressing the **OK** button at the bottom of the dialog.

2 **TK Memories**

The currently selected **TK Mem** is shown with an orange frame. Select another TK Mem with the designated digipot. They are recalled by clicking on the corresponding Mem button, either the number (1-128) or the name. The last recalled Mem is indicated by a green bar above the number.



NOTE!
Because of the different parameter sets TK Mems generated in 2K mode can not be selected in 4K mode and vice versa. Non-useable TK Mems are displayed light-gray (see figure below).

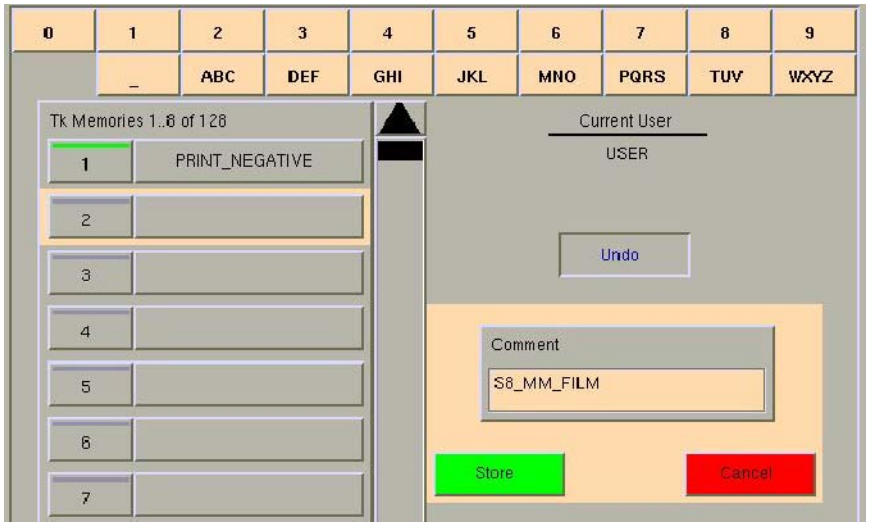


3 **Undo / Redo**

With the **Undo** / **Redo** button the user can toggle between the recalled Mem and the previous TK settings.

4 **Action Buttons**

TK Mems are saved by hitting the **Store** button. Select first the Mem where you want to store the current TK settings then hit **Store**. A popup dialog opens which enables you to label the current Mem. Click on the white space under ”Comment” to open the typewriter.



The label appears on the **Mem** button after confirming with **Store**. If you exit the dialog by just hitting **Store** the Mem will be stored under default name. To abort hit **Cancel**.

Select the Mem to be renamed then hit the **Rename** button. A popup dialog opens which enables you to input a different label. Click on the white space under "Comment" to open the typewriter. The new label appears on the **Mem** button after confirming with **Store**. To abort hit **Cancel**.

Select the Mem to be deleted then hit the **Delete** button. A popup dialog opens asking you to cancel or confirm the delete operation. Confirm with **Delete**, abort with **Cancel**. After deleting a Mem the button label disappears.

Table of Stored TK-Mem Parameters:

Dialog Group	Sub - Dialog	Control
Home	Overview	Test Pattern
Home	Overview	Focus
Home	Overview	Framing
Home	Overview	Light
Home	Overview	Audio Right
Home	Overview	Audio Left
Home	Setup	Test (switched on)
Home	Setup	Pattern
Tk Config	Film Deck	Focus
Tk Config	Film Deck	Film Speed
Tk Config	Film Deck	SAS Speed
Tk Config	SDTV	525 SDTV
Tk Config	SDTV	625 SDTV
Tk Config	SDTV	525 EDTV
Tk Config	SDTV	625 EDTV
Tk Config	SDTV	525844
Tk Config	SDTV	625844
Tk Config	HDTV	1250-50I
Tk Config	HDTV	1125-60I
Tk Config	HDTV	1125-5993I
Tk Config	HDTV	1080-60I
Tk Config	HDTV	1080-5993I
Tk Config	HDTV	720-60P
Tk Config	HDTV	720-5993P
Tk Config	HDTV	1080-24P
Tk Config	HDTV	1080-25P
Tk Config	HDTV	1080-2397P
Tk Config	HDTV	1080-24SF
Tk Config	HDTV	1080-50I
Tk Config	HDTV	1080-2397SF
Tk Config	HDTV	Characteristic
Tk Config	Data	Data-50
Tk Config	Data	Data-5993
Tk Config	Data	Image Size
Tk Config	Data	Packing Mode
Tk Config	Data	Data Conversion
Tk Config	Data	Image File Format
Tk Config	Data	Pixel
Tk Config	Data	Lines
Tk Config	Data	Preview Lut
Film	Matching	Light
Film	Matching	Film Type
Film	Matching	Perforation
Film	Matching	Color
Film	Matching	RED Gain
Film	Matching	RED Lift
Film	Matching	GREEN Gain
Film	Matching	GREEN Lift
Film	Matching	BLUE Gain
Film	Matching	BLUE Lift
Film	Masking	Masking
Film	Masking	Masking Mems
Film	Masking	Coeff 0
Film	Masking	Coeff 1

Dialog Group	Sub - Dialog	Control
Film	Masking	Coeff 2
Film	Masking	Coeff 3
Film	Masking	Coeff 4
Film	Masking	Coeff 5
Film	Masking	Coeff 6
Film	Masking	Coeff 7
Film	Masking	Coeff 8
Film	Masking	Characteristic
Color	Primary	Master Saturation
Color	Primary	Gamma Curve
Color	Primary	Gamma Level
Color	Primary	FCC Lift
Color	Primary	FCC Gamma
Color	Primary	FCC Gain
Color	Primary	Black
Color	Primary	Gamma
Color	Primary	White
Color	Primary	Color
Color	6-Sector	Position 0..5
Color	6-Sector	Width 0..5
Color	6-Sector	Luminance 0..5
Color	6-Sector	Saturation 0..5
Color	6-Sector	Hue 0..5
Color	6-Sector	Mark
Color	6-Sector	Master Chroma 6SC
Color	Col Set	Control Range
Color	Col Set	Characteristic
Color	Col Set	Limiter
Color	Col Set	Pattern Switch
Color	Col Set	Pattern
Sharp	Contour	Focus
Sharp	Contour	Contour
Sharp	Contour	Balance
Sharp	Contour	Coring
Sharp	Contour	Horizontal
Sharp	Contour	Vertical
Sharp	Aperture	Gain
Sharp	Aperture	Peak
Sharp	Aperture	Coring
Sharp	Expert	Special
Sharp	Expert	Edge
Sharp	Expert	Gain
Sizing	Sizing Data	Marker
Sizing	Sizing Data	Zoom
Sizing	Sizing Data	1:1
Sizing	Sizing Data	ReproH
Sizing	Sizing Data	ReproV
Sizing	Sizing Data	Repro Width
Sizing	Sizing Data	Repro Height
Sizing	Sizing Video	Marker
Sizing	Sizing Video	ZoomMode
Sizing	Sizing Video	Zoom
Sizing	Sizing Video	Rotation

Dialog Group	Sub - Dialog	Control
Sizing	Sizing Video	Scan Effect
Sizing	Sizing Video	Effect mode
Sizing	Sizing Video	ReproH
Sizing	Sizing Video	ReproV
Sizing	Sizing Video	Repro Width
Sizing	Sizing Video	Repro Height
Sizing	Repro	Fixed Aspect
Sizing	Repro	ACA Emul
Sizing	Repro	Cinemascope
Sizing	Repro	16mm Mode
Sizing	Repro	H&V Flip
Sizing	Repro	Fixed Repro
Sizing	Blanking Data	Tv Pos H
Sizing	Blanking Data	Tv Size H
Sizing	Blanking Data	Tv Po sV
Sizing	Blanking Data	Tv Size V
Sizing	Blanking Video	FilmPosH
Sizing	Blanking Video	FilmSizeH
Sizing	Blanking Video	Film Pos V
Sizing	Blanking Video	Film Size V
Sizing	Blanking Video	Tv Pos H
Sizing	Blanking Video	Tv Size H
Sizing	Blanking Video	Tv Pos V
Sizing	Blanking Video	Tv Size V
Audio	A Levels	Audio Left
Audio	A Levels	Audio Right
Audio	A Levels	Head Phone
Audio	A Levels	Mon Left
Audio	A Levels	Mon Right

Dialog Group	Sub - Dialog	Control
Audio	A Config	Source12
Audio	A Config	Ch Delay 22
Audio	A Config	Ch Delay 12
Special	Scream Prim	Bypass
Special	Scream Prim	Split Screen
Special	Scream Prim	High Light
Special	Scream Prim	Low Light
Special	Scream Prim	Blur Effect
Special	Scream Prim	RED Grain Reduction
Special	Scream Prim	GREEN Grain Reduction
Special	Scream Prim	BLUE Grain Reduction
Special	Scream Prim	Process Sensitivity
Special	Scream Prim	Test Pattern
Special	Scream Prim	Pattern
Special	Scream Prim	Test Signal Speed
Special	Scream Prim	Scene Cut Sensitivity
Special	Scream Sec	Bypass
Special	Scream Sec	SplitScreen
Special	Scream Sec	Show
Special	Scream Sec	Action
Special	Scream Sec	Luminance
Special	Scream Sec	Selection
Special	Scream Sec	LumThreshold
Special	Scream Sec	Chrominance
Special	Scream Sec	CenterHue
Special	Scream Sec	Width
Special	Scream Sec	Min Saturation
Monitoring	Test Pnt	Test Signal On/Off
Monitoring	Test Pnt	Test Signal

3.10.2 SUBMENU CUE

Menu button **“Cue”** opens new dialog**.** This menu provides you with Cue, Loop and Freeze functions.

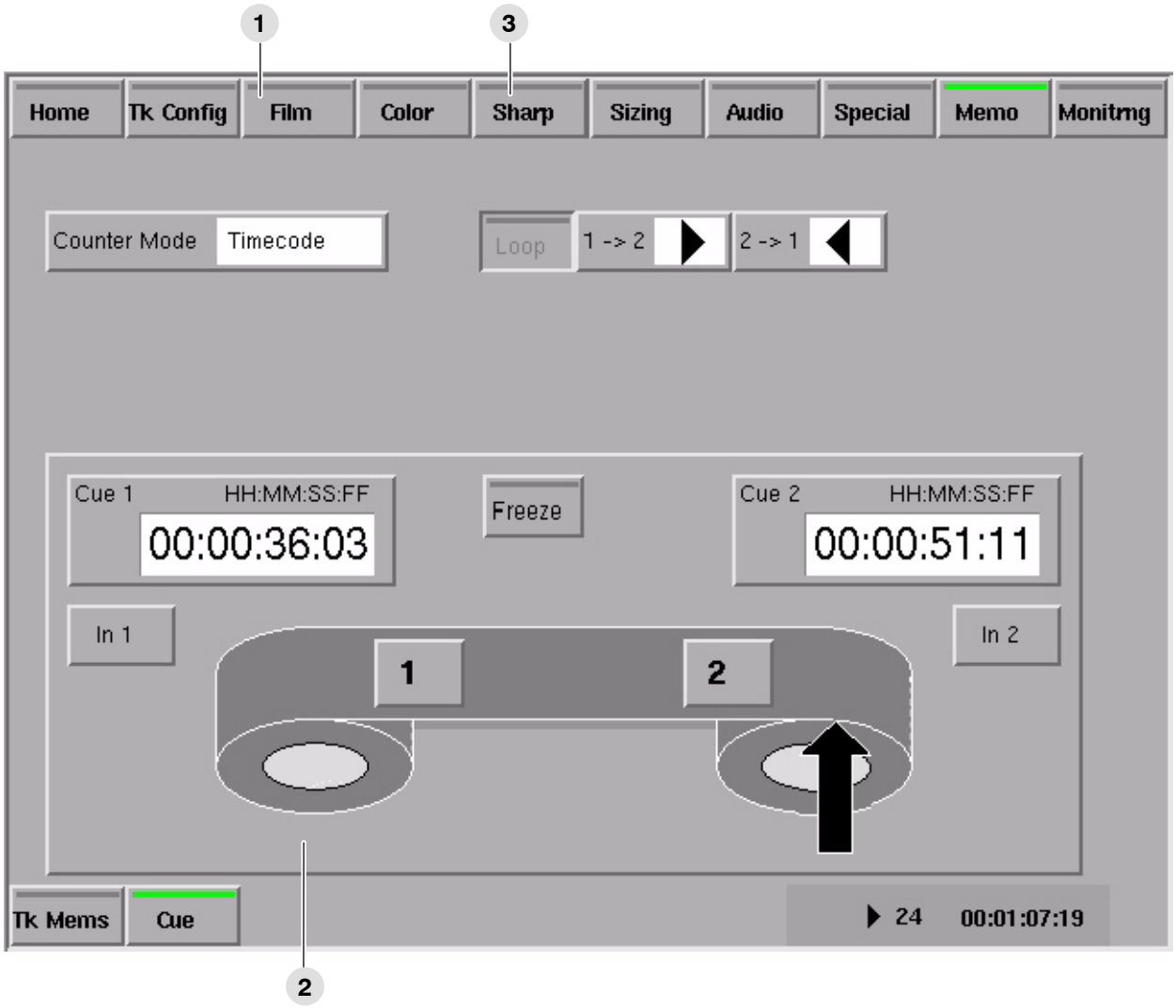
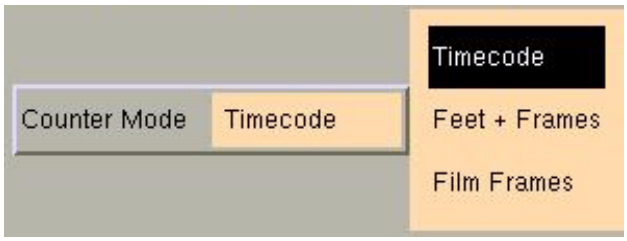


Fig. 355: Submenu **”Cue”**

Submenu “Cue” provides Cue, Loop and Freeze functions.
In this menu, film frame search can be selected and saved.

1 **Counter Mode Window**

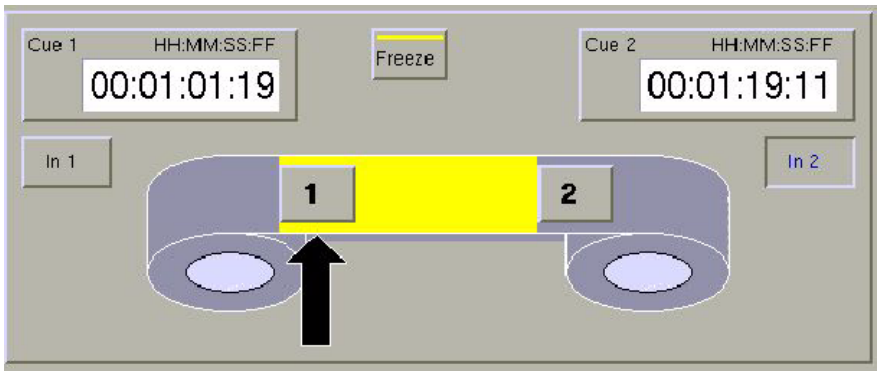
Here the user can switch the counter between Timecode, Feet+Frames and Film Frames.



2 **Cue 1/2 Settings**

Cue moves your material directly to a preselected position.
There are different ways of programming a Cue point. Move the material to the desired position and hit **IN 1.** The corresponding counter position will be entered and displayed above.
Instead of physically playing the material you can also just type it in. Therefore click on the counter display and a numeric keyline will appear on top of the page.
Type in the Cue timecode and confirm by pressing the **OK** button. Hitting the function **KEY 1** or **2** cues your material to the programmed position. This is done with shuttle or play depending on the current position of your film material.
Between the cue points 1 and 2, the selected mode applies. From outside or by hitting a function key twice, always Shuttle mode is performed.

Freeze mode suppresses every frame between the programmed freeze and defreeze points.

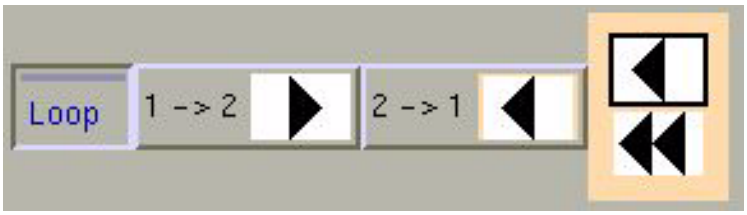


As long as your programmed freeze lasts, the last frame prior the freeze start will be shown. Freeze and defreeze can be programmed as described under Loop mode. Once entered, notice that the bar on the film roll display will be highlighted in yellow.
Hitting the **Freeze** button will execute this function if you play your material in **Forward** mode starting from somewhere before the freeze in-point.
Note that this function is not available in Play Reverse mode.

NOTE!
Freeze and Loop functions are not applicable at the same time.

3 Loop Mode

The **Loop** button is a switch to enable or disable the Loop function.
The adjacent buttons are to select Play or Shuttle mode to move the film between the loop start and end points.



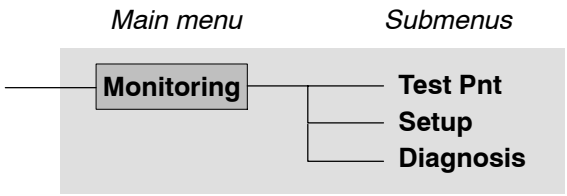
The **Loop** function allows you to repeatedly have a look at the same part of the material (e.g. for color matching purposes).

The material is moved from a programmed start to a programmed stop point and back again.There are different ways of programming a loop.
Move the material to the desired start/end points and press **In 1** / **In 2**. When pressing **In 1** or **In 2,** the corresponding counter position will be entered and displayed above. Instead of physically playing the film, you can also program start/end points by typing them in. Therefore click on the counter display and a numeric keyline will appear on top of the page. Type in the desired values and confirm by pressing the **OK** button.

Adjacent to the **Loop** button, **Play** or **Shuttle** mode can be selected.

Hitting the **Loop** button will perform your programmed loop until you hit **Loop** again.

3.11 MONITORING MENU



3.11.1 SUBMENU TEST POINT SELECTION

Submenu button **"Test Pnt"** opens dialog **"Testpoint Selection".** The menu contains Test Point and Test Pattern selection and serves to select the monitoring video signals for reproduction on a graphics monitor.
In order to benefit from this feature connect the Spirit 4K / 2K monitoring output to a graphics monitor.

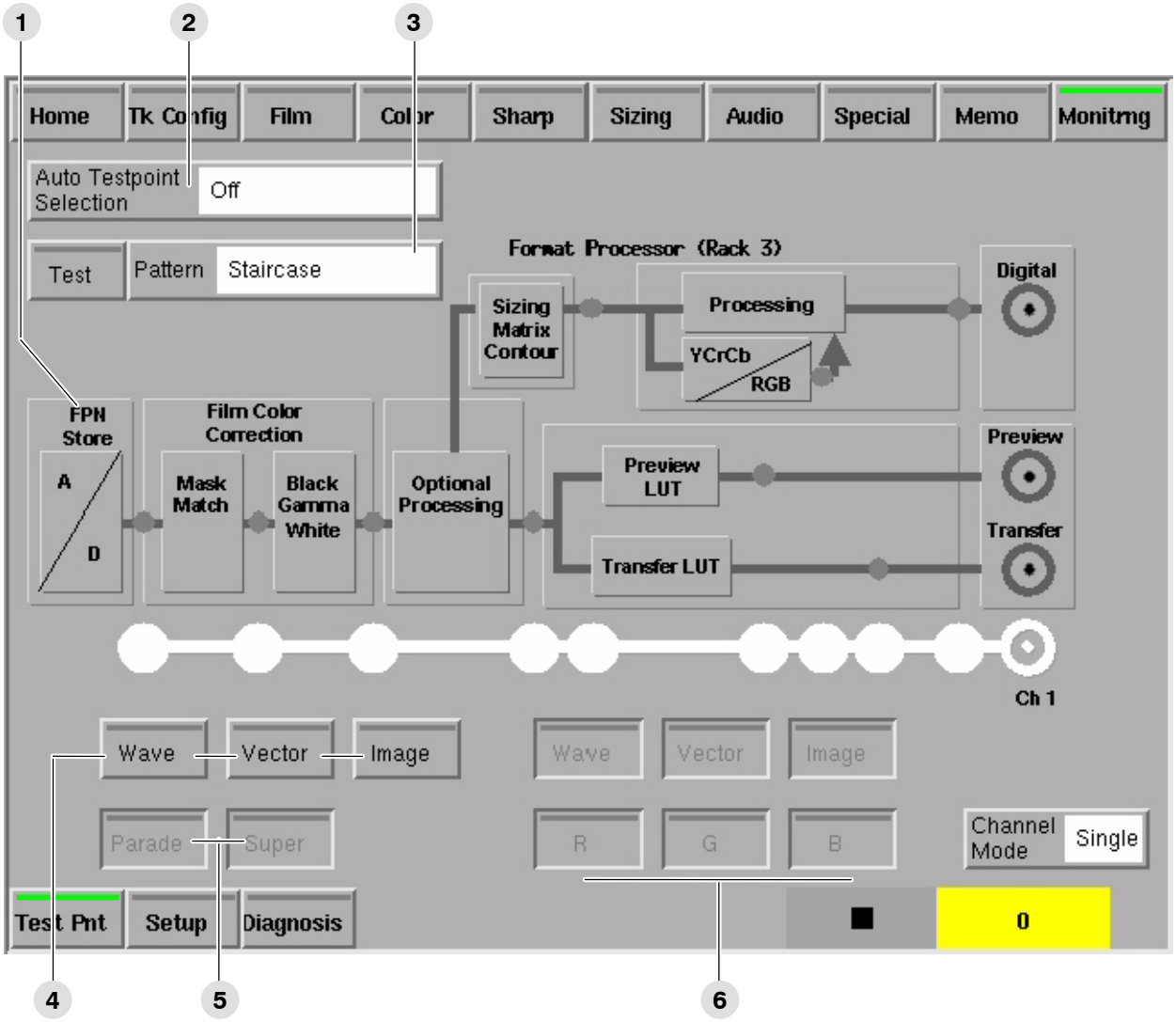


Fig. 356: Main menu **"Testpoint Selection"**

1 **Testpoint Selection Scheme**

This scheme roughly shows the path of signal processing in the Spirit 4K / 2K Film Scanner. The format processor path is only functional in the DataCine (Rack 3)!

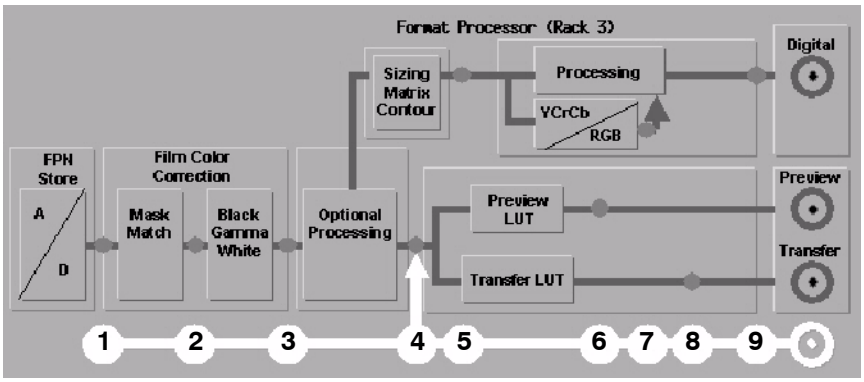


Fig. 357: Path of the signal processing**, Single mode**

Click on the white points below or inside the scheme to switch the Test Point to the desired position. The signal you are looking at on a graphics monitor corresponds to what a video signal would look like measured at that point. This is an emulation, such signals do not exist in reality as there is only data processed inside the machine.

Therefore this function cannot really be used in terms of troubleshooting but is an essential tool for color matching.

A rough guideline where to look at:

Test point 1: Signal source AiS, Illumination Adjustment

Test point 2: Masking, Matching

Test point 3: Primary Color

Test point 4: Optional Processing

Test point 5: Sizing Matrix, Contour in Format Processor (Rack3 of SDC 4000)

Test point 6: Preview LUT

Test point 7: YCrCb / RGB Converting in Format Processor (Rack3 of SDC 4000)

Test point 8: Transfer LUT

Test point 9: Processing Output in Format Processor (Rack3 of SDC 4000)

2 **Auto Testpoint Selector**

This function is very helpful for the colorist as it automatically swaps over the test point selection according to the control the colorist currently uses. The function can be switched On and Off.

3 **Test Pattern**

Switches the test pattern (–signal) on or off. The preselection of the test signal (”Staircase”, “Sawtooth”, “Color Bars” ...) is made in the dropdown menu “Pattern” within submenu **“Setup”**.

ON: test signal
OFF: film signal

Pulldown Menu Pattern

This pulldown menu serves to select the test signals.

4 **Wave** / **Vector** / **Image**

Display selection for the VGA monitoring screen.

5 **Parade** / **Super**

Display mode selection serves to switch the waveform signal between
- **Parade**: Mode displays the signals side by side (sequentially).
- **Super**: Means that all three signals are displayed on upon the other.

6 **R** / **G** / **B**

Color channel selection or deselection.

7 Channel Mode

With Channel Mode a “Single” or “Dual” monitoring can be selected. All selected signal are displayed on the VGA monitor. In “Dual” mode the screen is vertical splitted vertically. At most four windows can be displayed on the screen, for example Ch1: Vector & Image and Ch2: Wave & Vector.

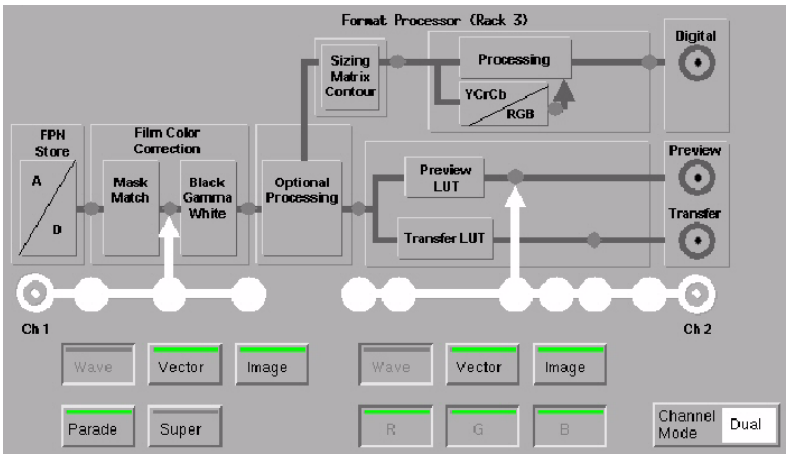


Fig. 358: Path of the signal processing**, Dual mode**

NOTE!
In “Single” mode the test signals will be displayed in real time.
In “Dual” mode every second frame will be displayed.

3.11.2 SUBMENU"SETUP"

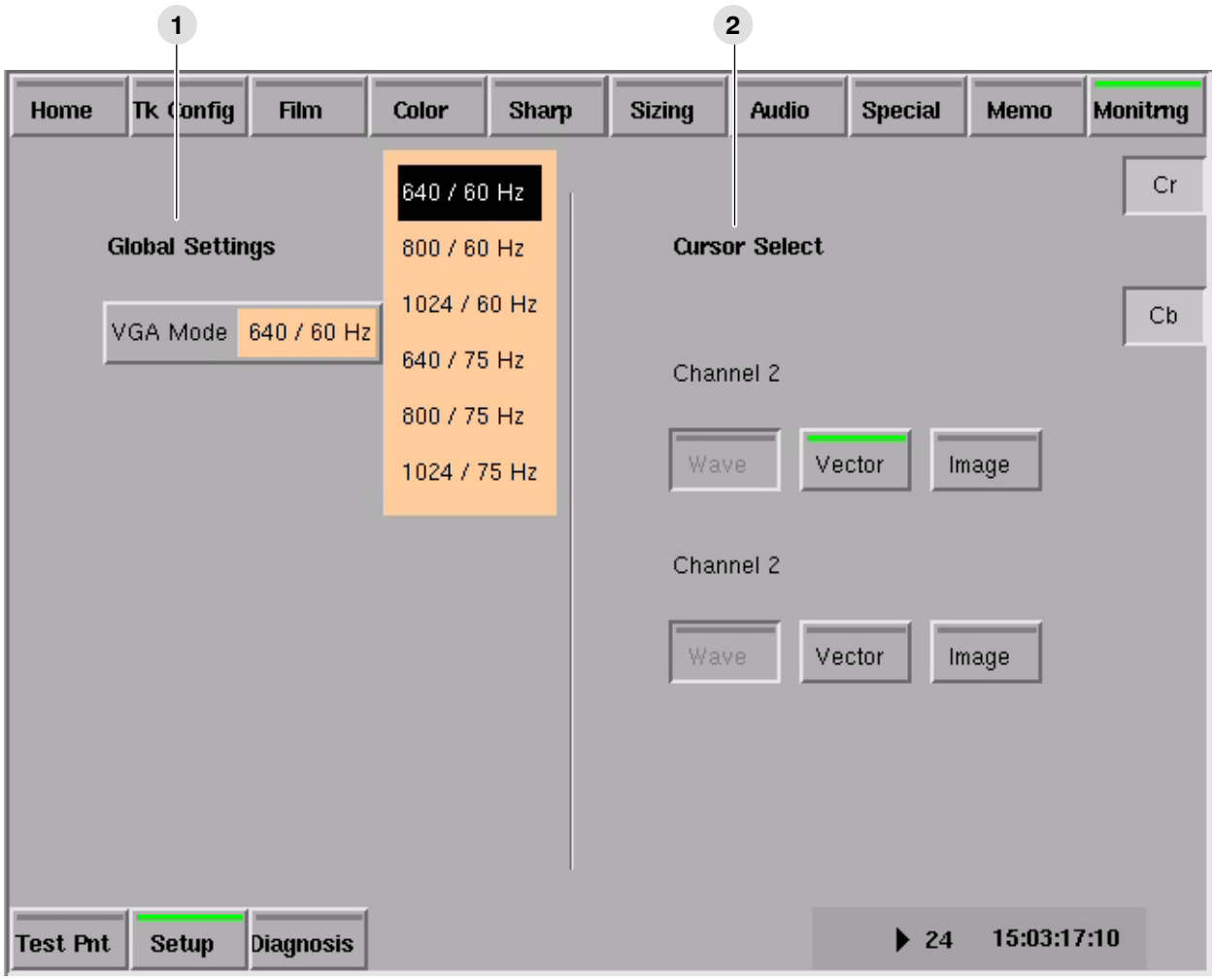


Fig. 359: Submenu **"Setup"**

1 VGA Mode

Select display resolution for the VGA monitor.

2 Cursor Select

The buttons serves to adjust the position of the cursor markers in the respective monitor windows.

3.11.3 SUBMENU DIAGNOSIS

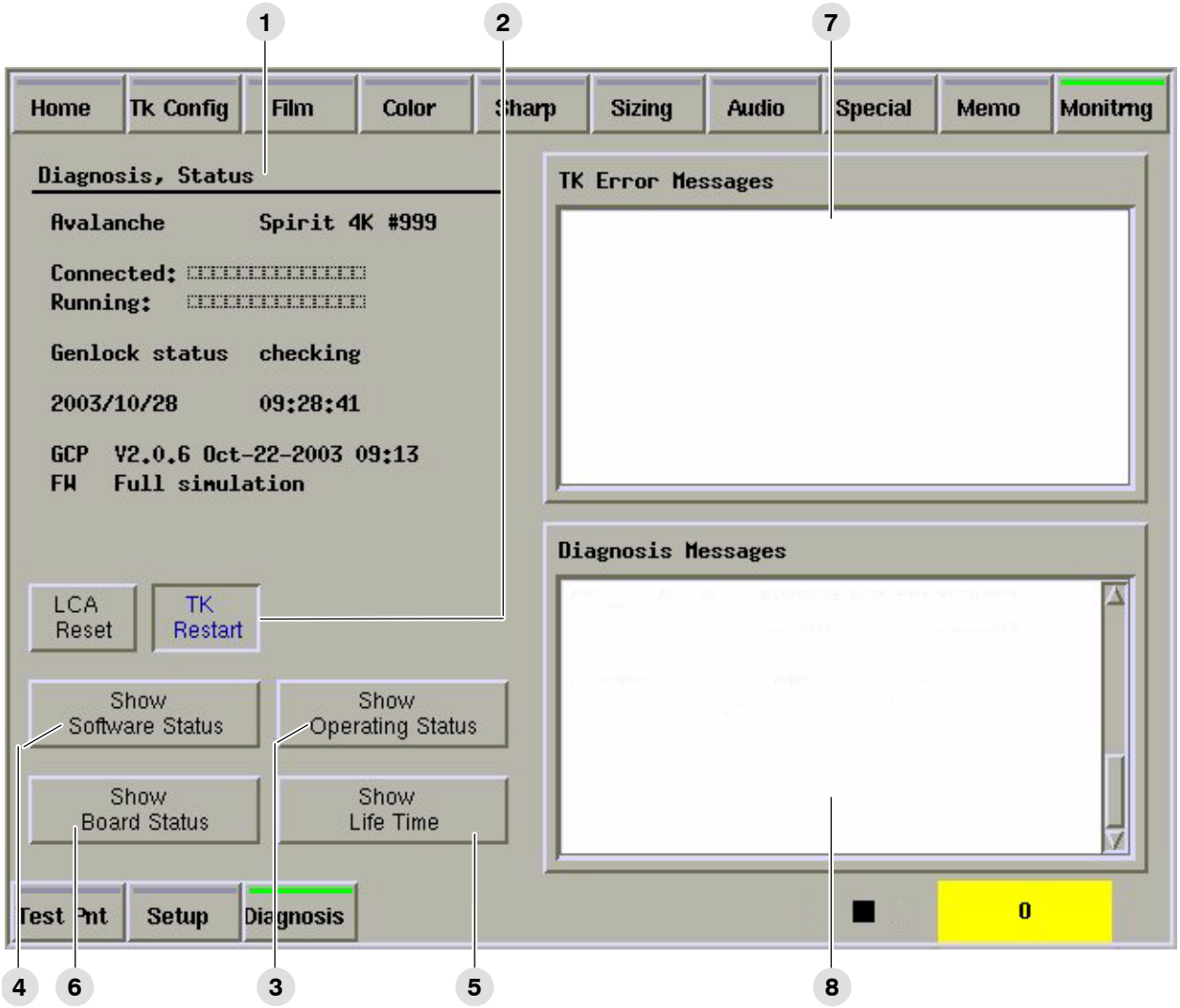


Fig. 360: Submenu **"Setup"**

1 Diagnosis Status Window

This window contains various system information such as: Film scanner serial number, the connected machine control units and their status, genlock status;date, time and the software and firmware versions of all connected devices.

2 **Reset Buttons**

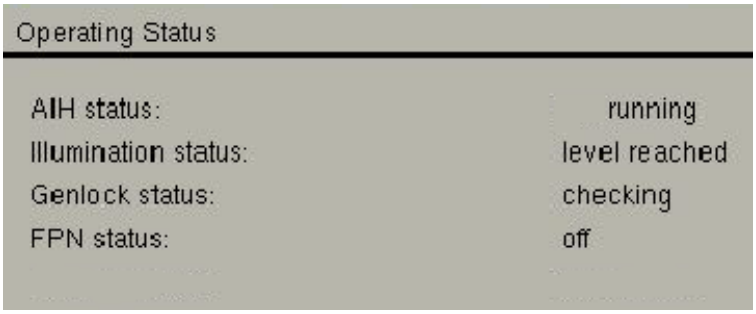
The Spirit 4K / 2K Film Scanner is provided with two reset buttons:

LCA Restart:
Restarts the communication between the GCP and the film scanner.

TK Restart:
Performs a software restart of all machine control units.

3 **Show Operating Status**

Click on this key to open the operating status window.



The operating status of certain parts of the Scanner is displayed.

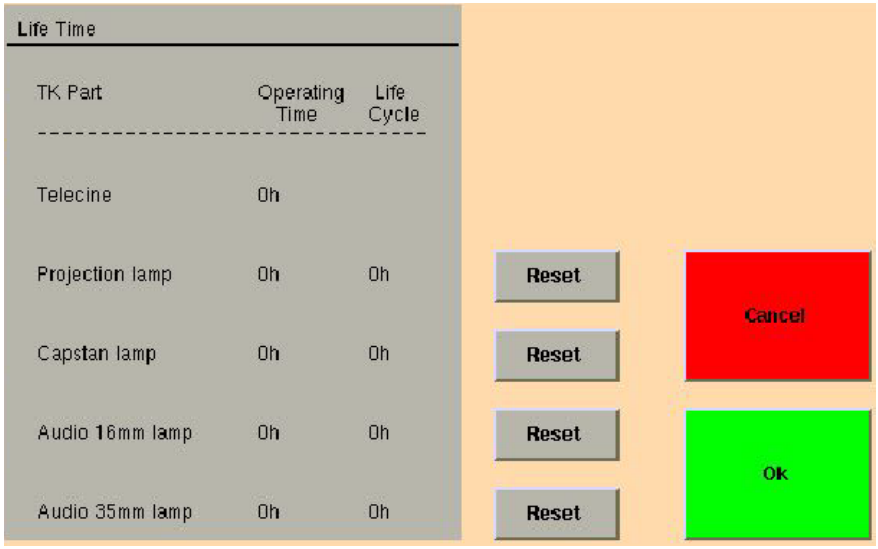
To exit the window, press the “**Close**” button.

4 **Show Software Status**

Click on this button to open the Software Status window. Here you can check the software versions of the machine control units (processors). Version numbers, date, protocol and control status information are displayed.
To exit the window, press the “**Close“** button.

5 **Show Life Time**

Click on this button to open the operating status window.



Here you can check the operation hours (”Life Time”) of certain parts in your Scanner and you can see after how many hours (”Life Cycle”) they should be replaced. The following units figure:
DataCine (in total), Projection lamp, Capstan lamp, Audio 16 lamp (optional), Audio 35 lamp (optional).In case a unit is replaced, the “Live Time” display can be reset by pressing the corresponding “**Reset”** button.

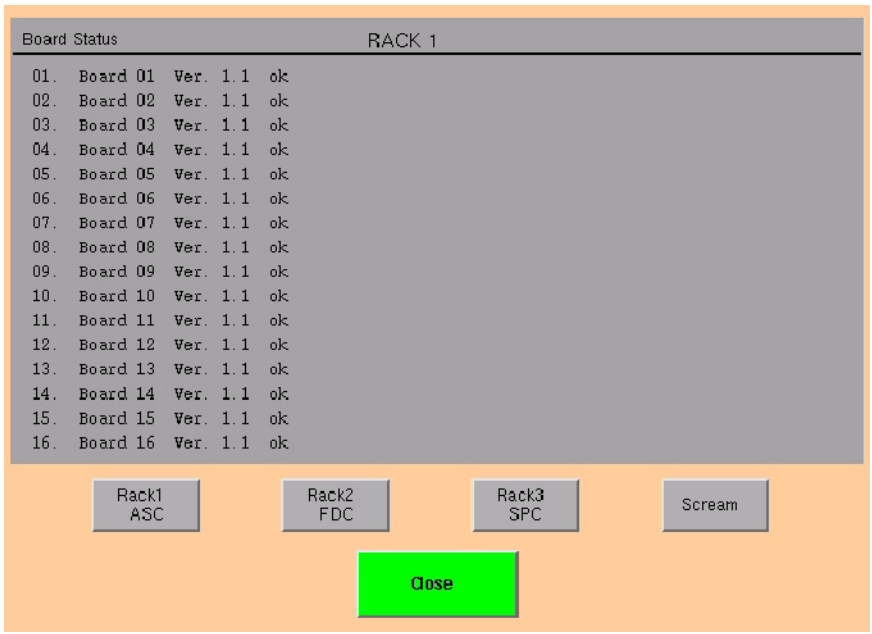
To exit the window, press the “**Close**” button.

6 **Show Board Status**

Click on this key to open the Board status window. Here you can check which boards are mounted in Rack 1, Rack 2 and Rack 3 of your film scanner.

If existing, they figure with slot number, identification letters and number, software and firmware versions.

To exit the window, press the “**Close**” button.


Board Status
RACK 1
01. Board 01 Ver. 1.1 ok
02. Board 02 Ver. 1.1 ok
03. Board 03 Ver. 1.1 ok
04. Board 04 Ver. 1.1 ok
05. Board 05 Ver. 1.1 ok
06. Board 06 Ver. 1.1 ok
07. Board 07 Ver. 1.1 ok
08. Board 08 Ver. 1.1 ok
09. Board 09 Ver. 1.1 ok
10. Board 10 Ver. 1.1 ok
11. Board 11 Ver. 1.1 ok
12. Board 12 Ver. 1.1 ok
13. Board 13 Ver. 1.1 ok
14. Board 14 Ver. 1.1 ok
15. Board 15 Ver. 1.1 ok
16. Board 16 Ver. 1.1 ok
Rack1 ASC
Rack2 FDC
Rack3 SPC
Scream
Close

7 **TK Error Messages**

Error messages sent from the film scanner are displayed in this window.

Example for a typical message:

```
”Standard error from FDC 2001.5.17.../
remote select rejected, door is open”.
```

It is possible to scroll through the messages by dialing the adjacent digipot.

To delete all error messages, hold down the UNITY button and click to the Error Messages Window.

8 **Diagnosis Messages Window**

Error messages from the GCP panel itself, e.g. provoked by wrong handling, are displayed in this window.

Not yet implemented!

3.12 EVENT LIST (OPTION)

The feature GCP Event List (EVL) consist of an operating software running on the Graphical Control Panel GCP1. Event List, operating in the Spirit 4K / 2K is designed to provide programmable TK control for timeline works.

With this feature all operational settings (e.g. Filmdeck, Matching, Color, Size, Audio & Special etc.) of the connected machine can be programmed on a scene by scene basis.

The Event List option comprises the following features:

- Programmable control (light, matching, zooming, sizing, grain reduction, audio, ...) for Spirit 4K / 2K.
- Storage of event list marks delivered by a “Scene Change Detector”
- Scene by scene programming with frame accurate execution
- Programmable fades & transitions
- Different durations of events for different groups of controls
- Copy and modifying modes of separate groups of controls
- Miscellaneous navigation functions - backwards and forwards
- Hierarchical menu structure for User, Project and List
- Import of pull lists (EDLs)

3.12.1 STARTING

1. Press the hard key “**Event List Menu**” on the control panel to change from a main menu (e.g. Home) to the Event List menu.

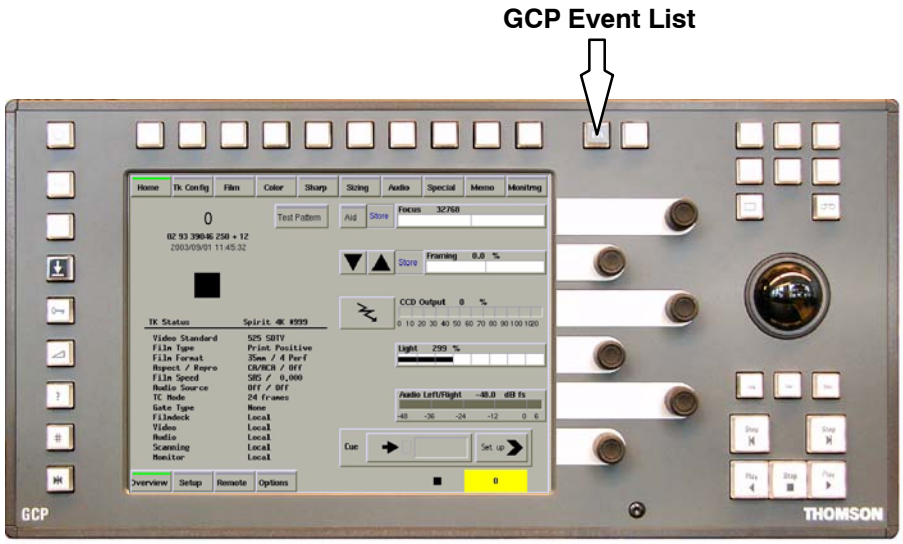


Fig. 361:

The File menu Event List appears.

Fig. 362:

2. Click **Open** to select an existing event list or press **New** to create a new event list.

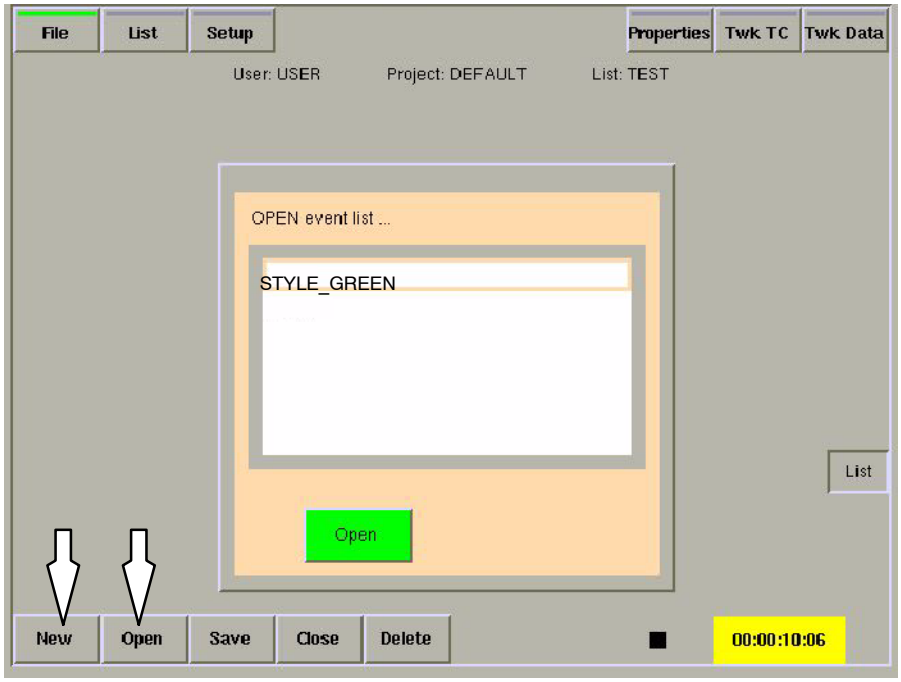


Fig. 363:

3. Once a list is selected or a new list is opened you are automatically swapped to the submenu “**List**“.

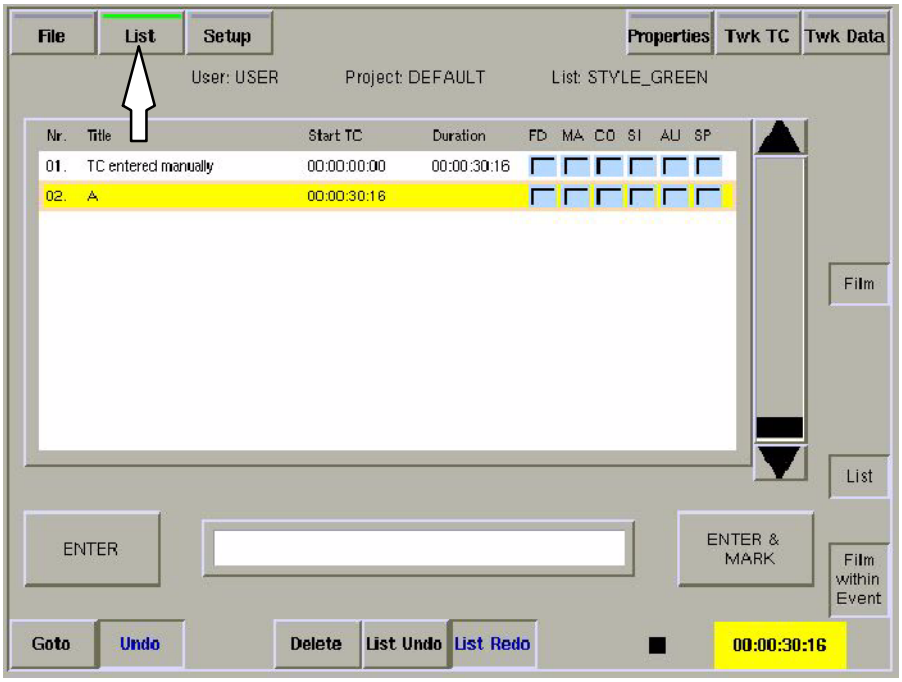


Fig. 364:

4. Click on “**Setup**” to enter the Setup menu.

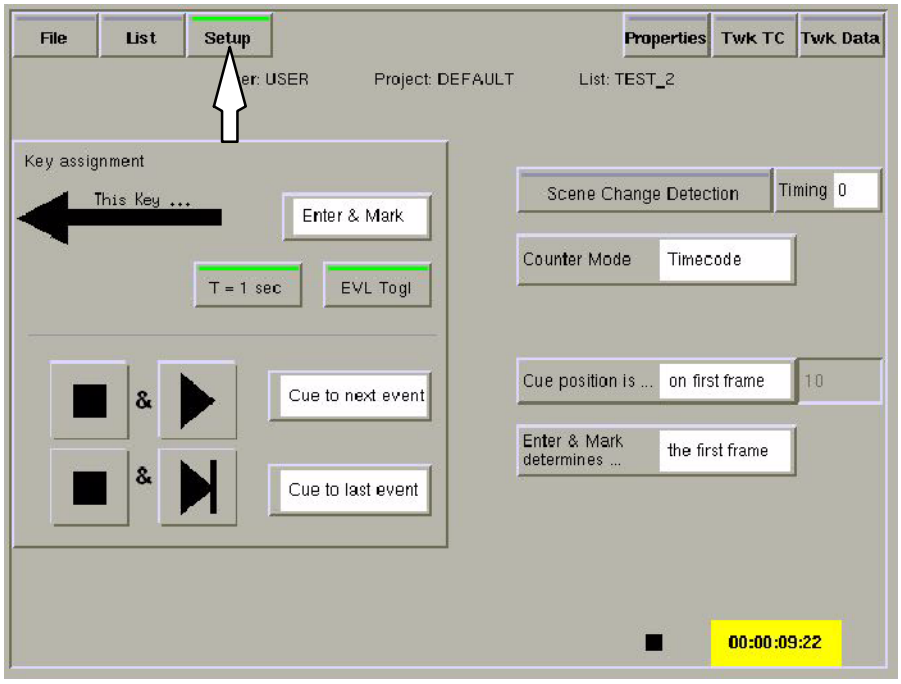


Fig. 365:

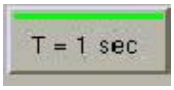
Menu **Setup** contains different setups for functions, hard- and softkeys in conjunction with event list / timeline works.

3.12.1.1 Button Assignment

Different functions can be assigned to the GCP hardkey where the arrowhead is pointing at.

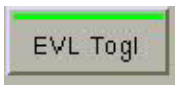
Choose **Enter** or **Enter & Mark** to delegate these functions on this hardkey; it saves you from toggling to the EVL List menu while working on GCP telecine main menus.

The currently active function (Enter or Enter & Mark) is shown on the button display.



T = 1 sec specifies the function of Enter & Mark (if enabled). If switched on (the green bar on the button is lit) events will only be added to your timeline in case the hardkey gets pressed for at least a second.

If T = 1 sec is disabled events will be added to your timeline no matter how long the hardkey is pressed.



If **EVL Togl** is enabled (the green bar on the button is lit) pressing the hardkey for at least a second will toggle the GUI from GCP telecine main menus to EVL or vice versa.

If EVL Togl is disabled the toggle function of the hardkey is switched off.

3.12.1.2 Scene Change Detection

Events can be added manually to the timeline by pressing Enter & Mark on the List menu, by pressing the dedicated hardkey (please refer to key assignment) or automatically by using the Scream 4K/2K (option) scene change detector.

If enabled the green bar on the button is lit.

Detected scene changes will be added at the end of the list as well as inserted. To avoid undesired inserts switch it off.

In order to adjust the timing of the automatic scene change detection use the adjacent setup button. To modify the timing (in frames) use the corresponding digipot or click on it to open the typewriter.

Confirm by hitting OK. The range allows for –10 to +10 frames, the current setting is shown on the key display.

3.12.1.3 Counter Mode

To change the current counter mode click on this button and chose from the drop down menu. **Timecode**, **Feet & Frames** and **Frames** is selectable. This selection affects the timeline display in the list menu. Start scene and scene duration will be displayed according to the current selection.

3.12.1.4 Cue Position

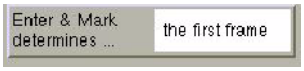
This setup determines the frame within an event on which the telecine stops when in Goto mode.

Click on the button to select from the drop down menu. On **first frame**, **on frame number**.., **in center**, **on last frame** is selectable.

If **on frame number** is selected the adjacent number button gets activated.

To modify the value (in frames) use the corresponding digi-pot or click on it to open the typewriter.

3.12.1.5 Enter & Mark Determines...



This setup determines wether the TK position has to be on the **first** or on the **last frame** of a scene to enter an event / mark.

No matter which mode is selected the mark will always be on the same position. The only reason to change this setting is to work in the way your are used to.

NOTE!
In the list display the timecode of the first scene frame is displayed, not the timecode of the event position. In first frame mode both are the same but in last frame mode the displayed timecode varies by one frame!

3.12.2 BACKUP EVENT LIST DATA

1. Pressing twice the **GCP Power On/Off** button during operation opens the **Copy** dialog.

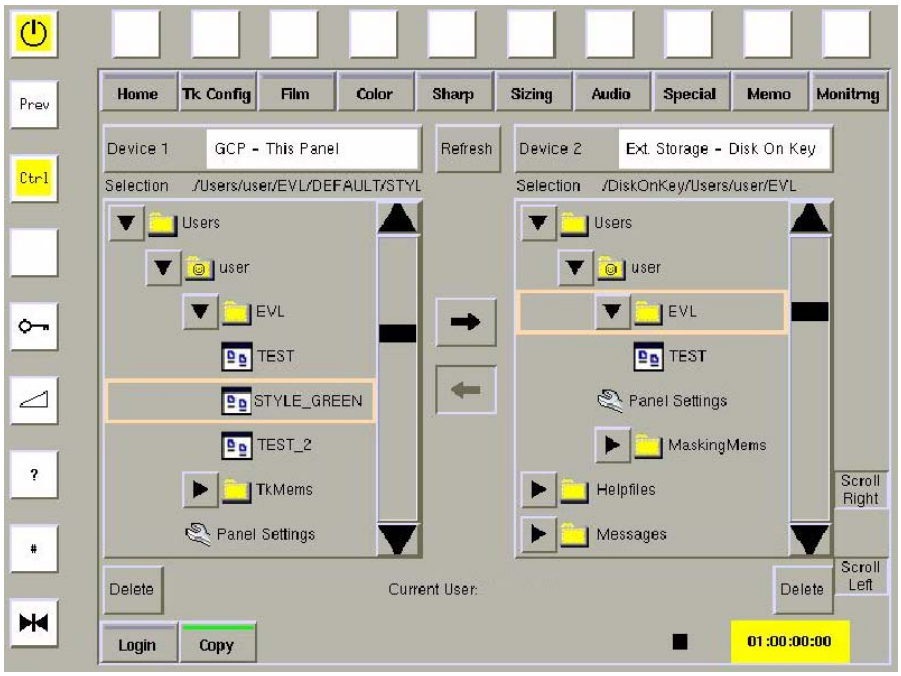


Fig. 366: **"Copy"** dialog

The **Copy** dialog can be used to copy **Event Lists** to an external storage device. Data can also be reloaded from an external store or copied to a different directory on the external or local store/disk.
As an external store, a USB Flash Memory can be used.

The Copy dialog contains two option menus (**Device 1** and **Device 2**). Each can be delegated either to the GCP HardDisk or to the DiskonKey.

The directory tree of the chosen disk is shown in the adequate display of Device 1 and 2.

- The directory **Users** contains a sub-directory for each user configured, titled with the name of the respective user. These **User** directories contain user settings like **Panel Settings, Masking Mems, Tk Mems** or **Event Lists**.
- The directory **EVL** contains the **event list files.**

3.12.3 WORKFLOW

3.12.3.1 Features

- Event list adds a timeline-based color correction functionality to the GCP.
- Different enhancements applying to different sections (scenes) of one piece of film can be stored on a scene by scene base (events).
- A chain of events makes up a list.
- Anytime lists can be recalled or modified. They are used to play back the material in a programmed way.
- Changes in parameter settings are executed frame accurately.

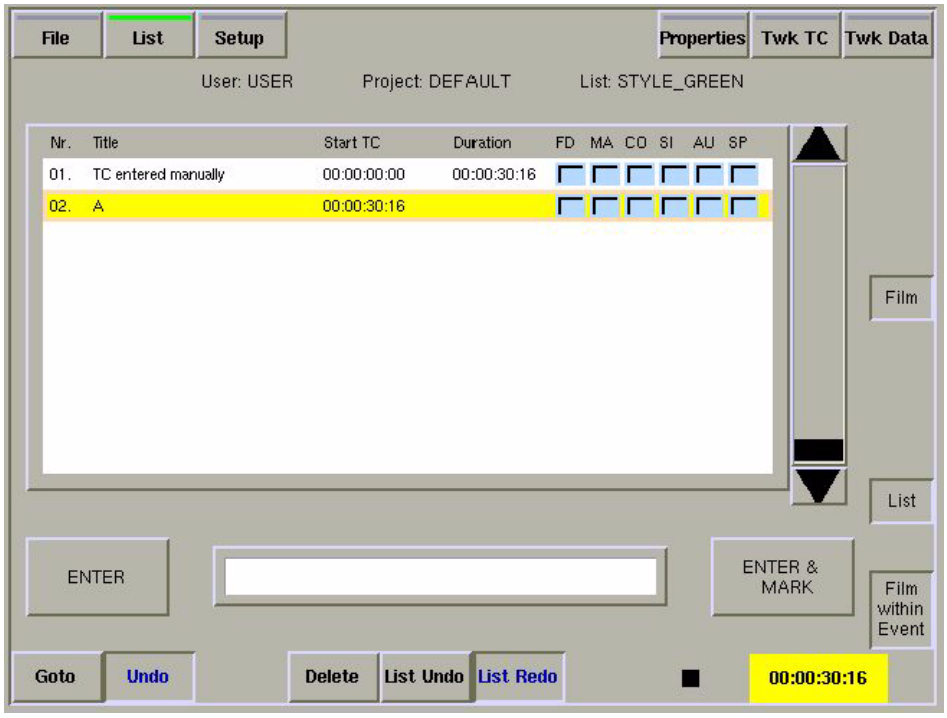


Fig. 367: Event List menu

3.12.3.2 Typical Operation

Login and Setup

Log in the GCP under your user to make sure all setups and slider-sensitivities are recalled according to your settings.

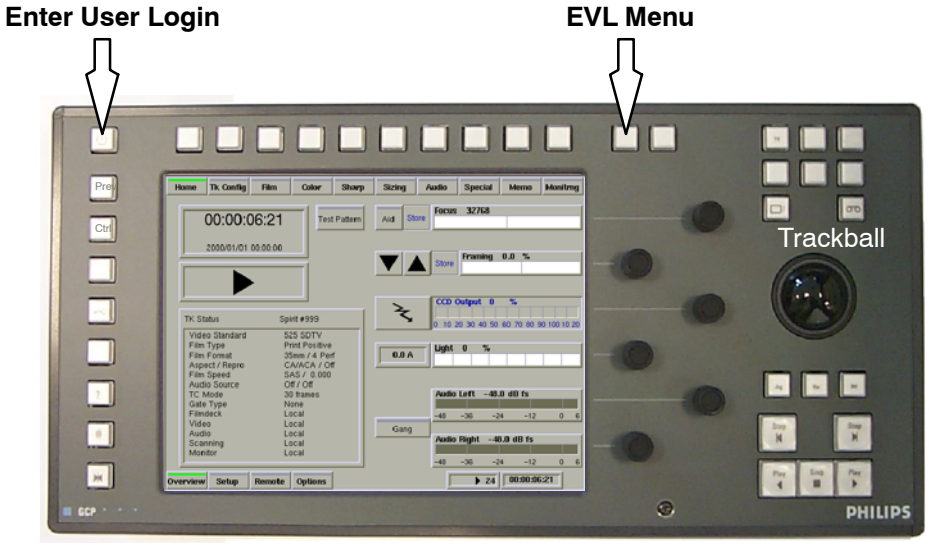


Fig. 368:

Select EVL

Press the hard key **EVL Menu** to enter the event list menu.
The menu page **File** appears.

File Menu

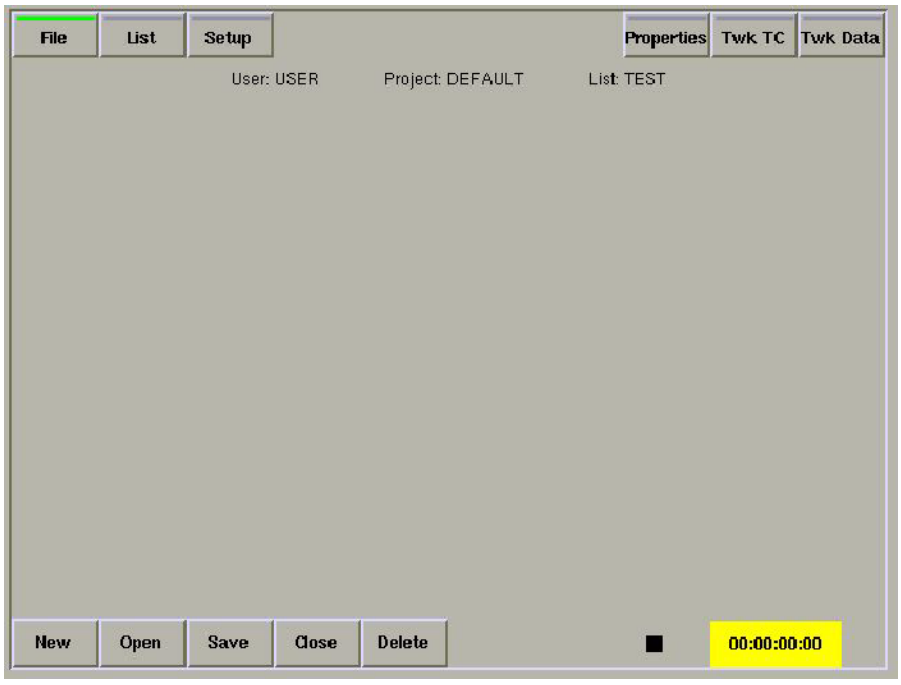


Fig. 369: Main menu EVL

Select a List

To create a new Project/List hit **New**. Click on the input field to open the typewriter in order to name your new list. For more details please refer to the online help files.

Once you have selected an already existing event list or crate a new event list, the List menu page is displayed automatically.

List Menu

To continue working on an already existing Project/List click **Open** and select from the window.

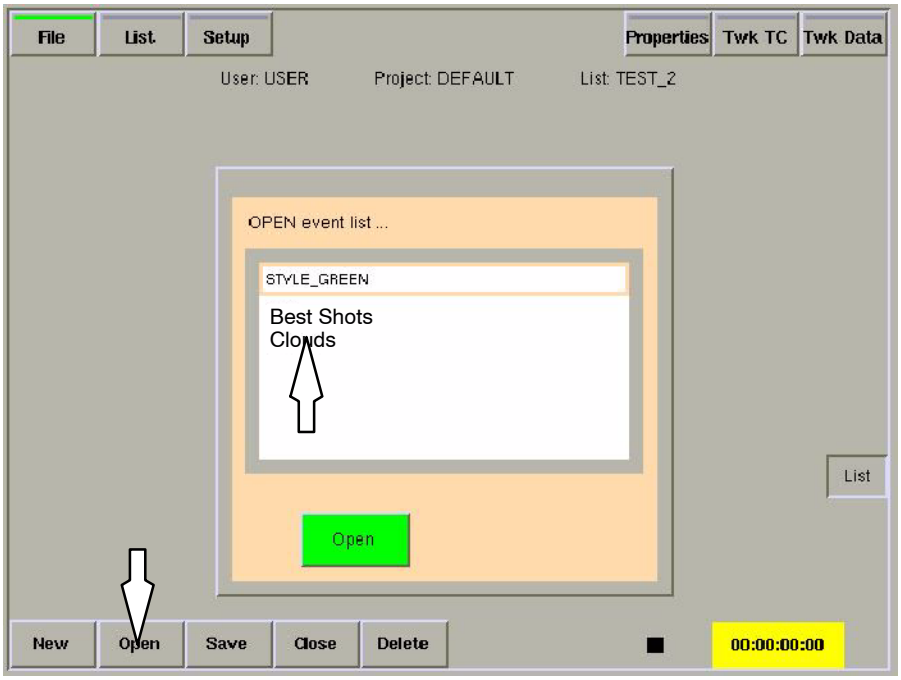


Fig. 370: Menu File - Event list window

Now start building up your list. Anytime you hit (Enter & Mark) a new event is created.

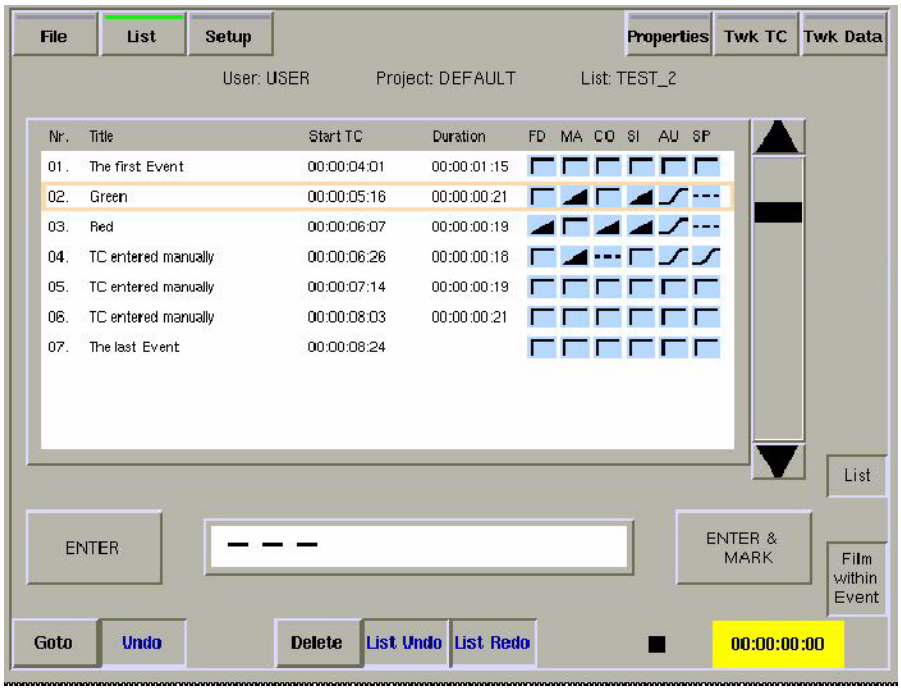


Fig. 371:

NOTE!

- ***Marks normally are placed on the first frame of a scene.***
- ***Existing events are displayed in the list defined by event number, start timecode, eventually name, duration and eventual transitions.***
- ***Current settings are stored within one event by hitting Enter. Select the corresponding menu pages in order to alter settings like color enhancement, sizing or whatever needs to be done to the current scene.***

Lace up your material on the telecine and place it on a frame which is easy to remember or punch in a hole. Go to the **TK Config** / **Timecode menu** and set the timecode to a typical value like 01:00:00:00 e.g.

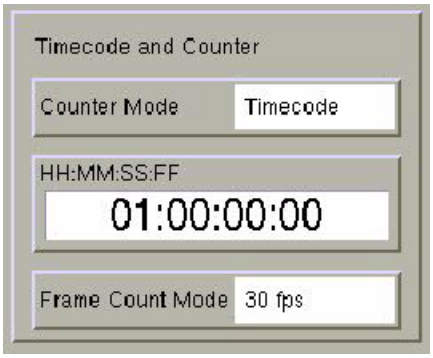
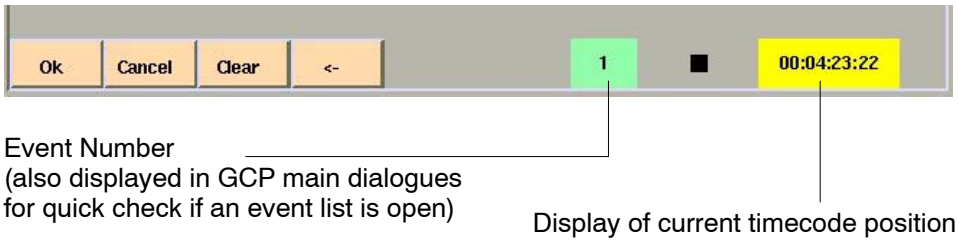


Fig. 372: GCP Menu TK Config - submenu Time Code

Scroll Mode

Use the **List** digipot to scroll through your list. This way setting from e.g. previous events are recalled and can be copied to the current position by pressing **ENTER**. Olace the list cursor on any event in your list, then hit **Goto** in orderto shuttle the telecine to this position.



We recommend to keep "**Auto Re-Scan**" (menu TK-Config) switched off to ensure a proper scroll operation. Programmed changes in Illumination, Focus, Framing and +6dB within a list would activate Auto "Re-Scan" and therefore cause a jump in the Scroll display.

Undo / Redo Delete

Toggling between two conditions for comparative reasons is possible between stored and not yet stored settings.

Therefore use **Undo/Redo.** Undo leads to the settings "as it was before", Redo brings back your current modification.

In order to remove an event from your list hit **Delete**.

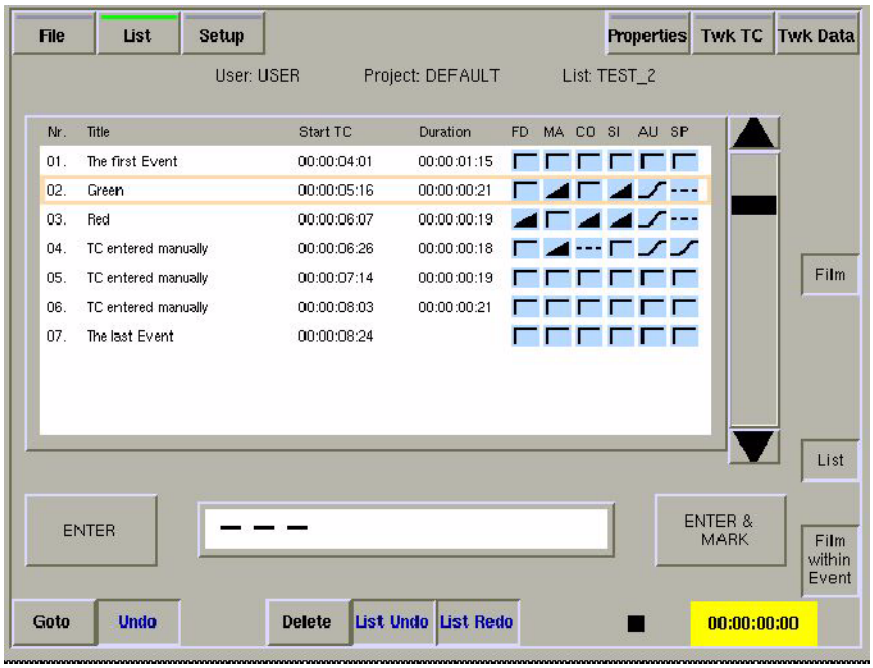


Fig. 373: Function buttons of the event list menu

NOTE!
If an event is to be deleted, position the telecine on that event and hit Delete. If deleted, the previous event becomes longer and the settings of the previous event are maintained.

- ***List Undo brings back any list modifications.***
- ***Goto serves to shuttle the telecine to a defined position.***
  Place the list cursor on the desired event and hit Goto.
  The telecine then shuttles to a timecode position which corresponds to the selected event timecode.

Once your event list is finished move to the File menu page to actively save this list.

Save

Hit **Save** to store a session file. In case of an already existing list with the same name you will be prompted to overwrite this file or not.

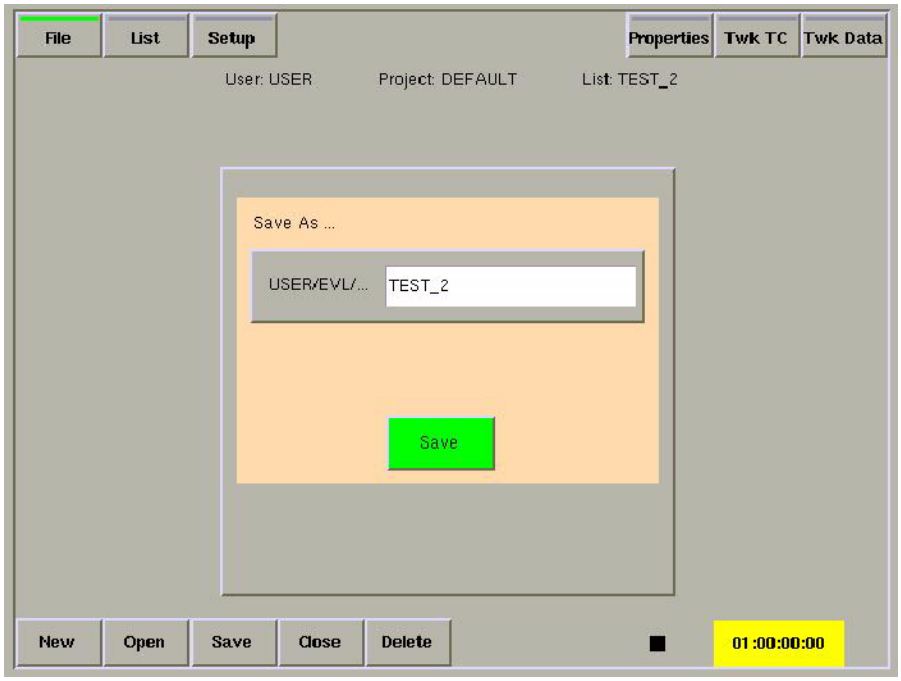


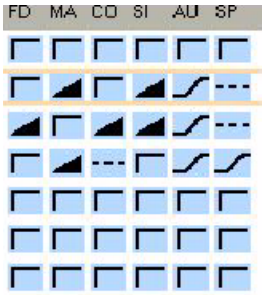
Fig. 374:

NOTE!
The GCP EVL contains a permanent backup function, so no worries in case of power breakdown, your list is saved automatically at any moment. In any such cases you will be prompted to load the unsaved list in order to recover it the next time you enter the File menu page. Please refer to the online help files to see how enhanced list functions are handled.

Those can be accessed under Properties, Tweak Data and Tweak Timecode on the List menu page.

3.12.4 ENHANCED LIST FUNCTIONS

3.12.4.1 Functional Groups



The following functional groups can be programmed separately:

- FD = “Filmdeck” contains settings of the TK menu
- MA = “Matching” contains settings of the Film menu
- CO = “Color” contains settings of the color / 6SC menu
- SI = “Size” contains settings of the Sizing menu
- AU = “Audio” contains settings of the Audio menus
- SP = “Special” contains settings of the Special (Scream / Edge Proc)menus

3.12.4.2 Properties

Properties of an event are **Name** and / or **Transition Type.**

Hit **Properties** if you want to name or rename an event and to set a transition type.The emerging menu page contains a "**Name**" input box. Click on it to open the typewriter, type in the name and confirm by pressing OK at the bottom of the dialog. Hit Close to come back to the List menu page.

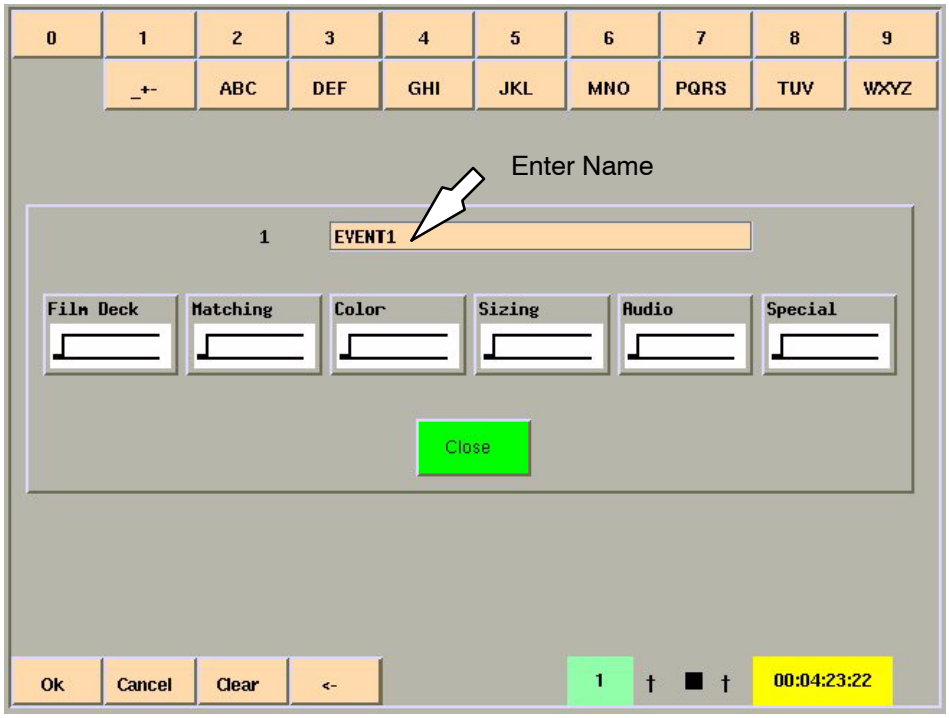


Fig. 375:

A simple and handy way to open **Properties** is to double-click on the event line in the list (right on the touch-screen).

Changes in parameter settings are executed instantly when a mark is crossed but situations may arise where a dynamic change of settings is required (e.g. example a camera travel from inside to outside).

Therefore a transition can be applied. Generally transitions can be applied to all, some or just one functional group(s).

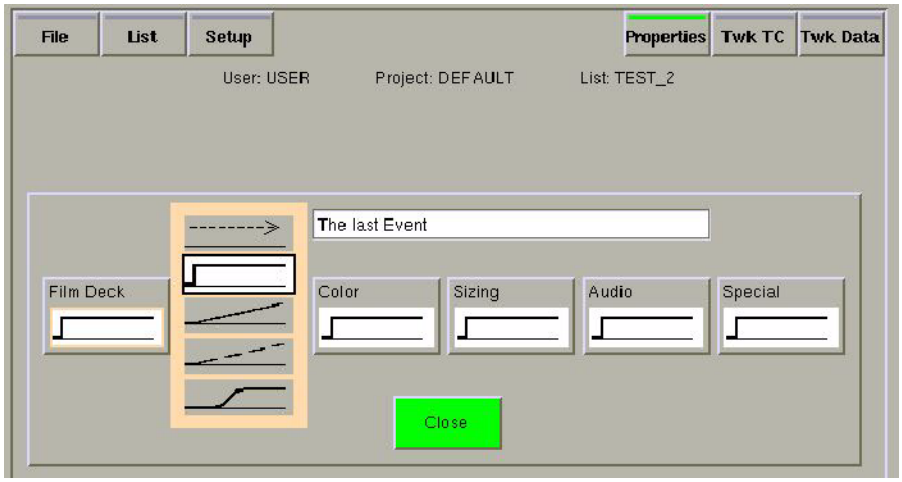
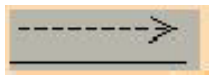


Fig. 376: Submenu Properties - Transition Effects for functional groups

Select the group by clicking on its dedicated button and choose the desired transition type from the drop-down menu. Hit Close to come back to the List menu page. Name and transition type will now be displayed inside the list window. It is possible to copy settings from any event to the current event, e.g. in case a certain scene appears repeatedly.

3.12.4.3 Transitions Types



Transition Type Pass
settings do not change

Transition Type Cut
settings change immediately

Transition Type Fade
settings change continuously

Transition Type Linear continued
settings change
continuously over “n” events

Transition Type S - characteristics

Fig. 377: Transitions

3.12.4.4 Tweak TC

Tweak Timecode can be used to enter an event numerically (left window) or to shift events (right window).

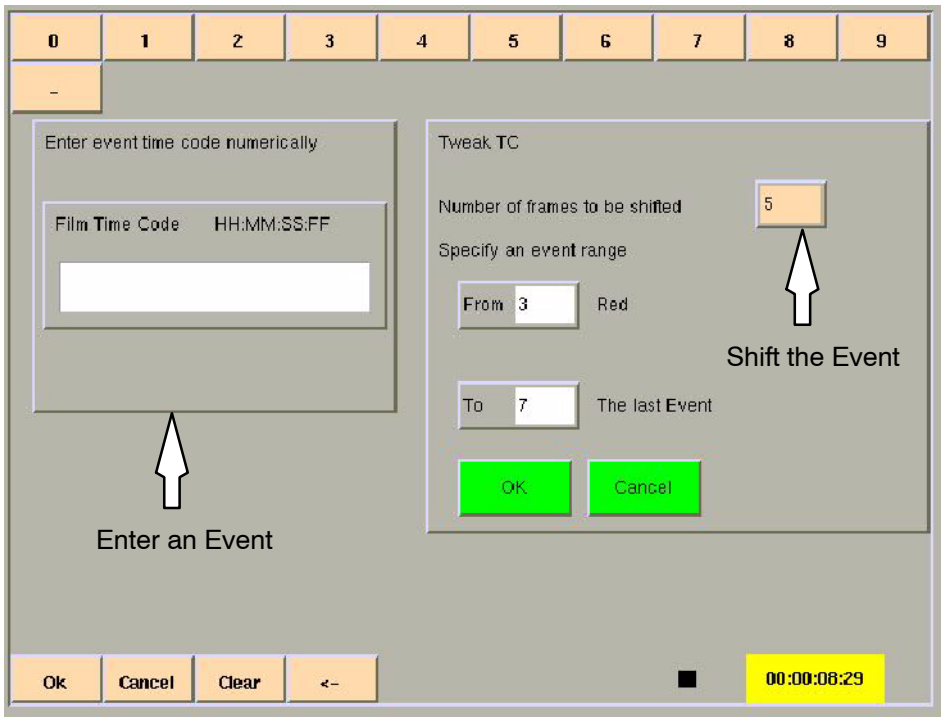


Fig. 378:

Hit **Twk TC** if you want to enter an event numerically. The emerging menu page contains a Timecode input box. Click on it to open the typewriter. Once the input is finished you automatically get back to the List menu page.

NOTE!
The input appears as Timecode, Frames or Feet & Frames dependent on what is selected in the Setup.

Hit **Twk TC** if you want to shift one event (the current event is default), a group of events or the whole list on the timeline. Tweak TC (right window) contains three input boxes, the top right one applies to the amount of frames event(s) to be shifted. Click on it to open the typewriter. The input boxes below (**From** / **To**) are needed to define the range of events to be shifted.

If nothing is entered here only the current event (whose number is entered by default) will be shifted.

If you want to shift a group of events enter the number of the first event to be shifted (**From**) and the number of the last event to be shifted (**To**).

If you wish to shift the whole list enter ”**0**” to ”**999**”

(even if you don’t know the exact number of your last event, just input some high value, it will automatically be corrected).

Having confirmed by hitting **OK** you automatically get back to the **List** menu page. Cancel aborts the action.

3.12.4.5 Tweak Data

This submenu offers tools for enhanced copy actions.

Hit **Twk Data** if you want to copy only one (or more) parameter(s) from some event into your current event or into a group of events or into the whole list.

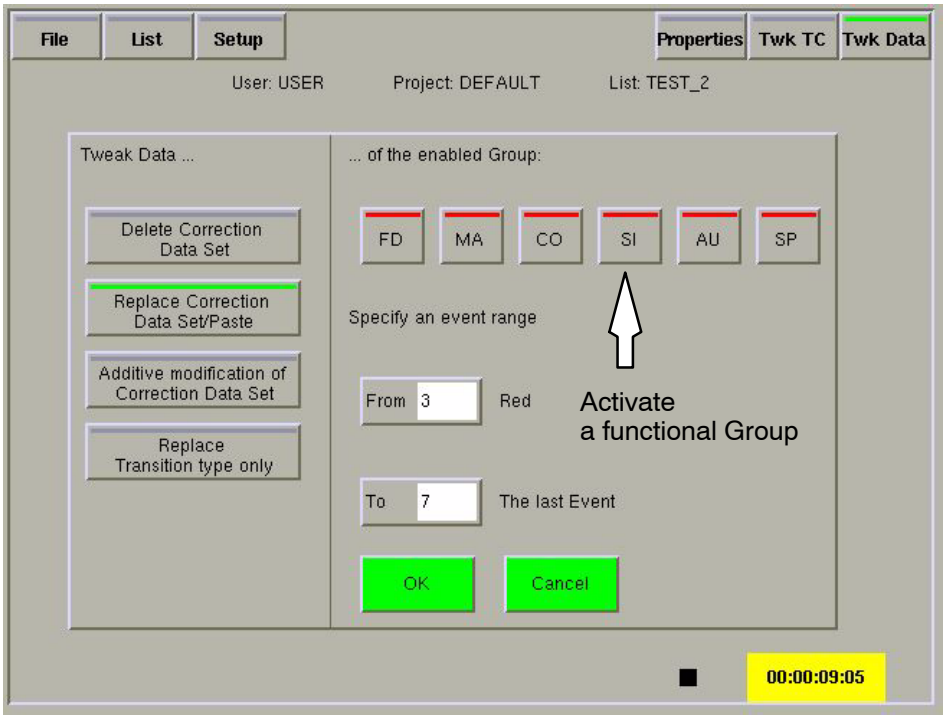


Fig. 379:

All parameters contained in one event split up in six (functional) groups which are the following:

- **FD** stands for Filmdeck (such as Tk speed)
- **MA** stands for Matching (contains lamp settings, negative matching, filter-wheel, position and masking),
- **CO** stands for Color (color primaries and secondaries corrections),
- **SI** stands for Sizing (aspect ratios, zoom, position, rotation),
- **AU** stands for Audio
- **SP** stands for Special (Scream grain reduction, edge processing).

Activate the functional group of which the desired parameter is part of by clicking on the dedicated button (red bar is lit if active).

Specify an event range where the chosen group settings are to be copied to.

Hit the **From** button to open a numeric keyline on top of the page.

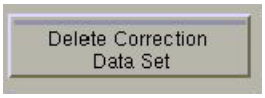
Enter the number of the first event.

Hit the **To** button, enter the number of the last event.

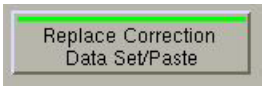
If nothing is entered here the copy action will only apply to the current event (whose number is entered by default). If you wish the copy action to cover the whole list enter ”0” to ”999” (even if you don’t know the exact number of your last event, just input some high value, it will automatically be corrected).

Having confirmed by hitting OK you automatically get back to the List menu page. Cancel aborts the action.

Different copy modes are available:



- Delete correction Data Set cancels all data modifications.



- Replace Correction Data Set (this is probably the most common mode), previous settings will simply be replaced by the ones which are copied.

- Additive modification of Correction Data Set means that the copied settings are added to the previous settings.

- Replace transition type allows to replace the transition type of the selected functional groups all at once.

Make your choice by clicking on the dedicated button (green bar is lit if active).

3.12.5 SETUP MENU

Events can be entered manually or automatically by using an external scene change detector.
Select the **Setup** menu and switch on **Scene Change Detection.**

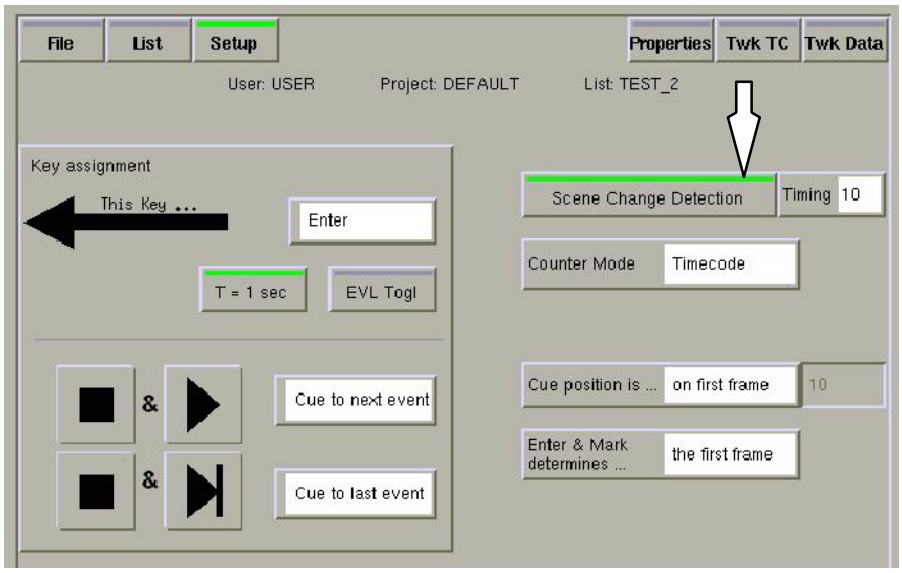


Fig. 380: Scene Change Detection

NOTE!
As the scene change detector is part of Scream 4K/2K option, this function is only accessible if a Scream 4K/2K board is installed in Rack 2 / Slot 6.

In order to avoid toggling permanently back and forth from the EVL menu pages assign **Enter** to a hard key. This assignment is done on the EVL Setup menu.

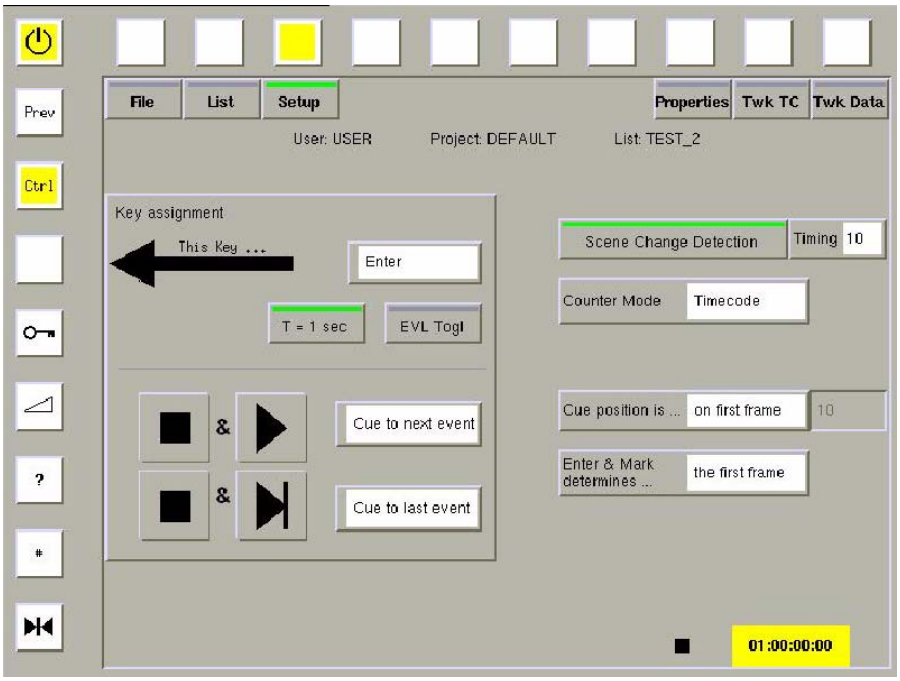


Fig. 381: Setup menu

4. MAINTENANCE

Modern film scanner units stand out for high life expectancy and low maintenance expenditure. Nevertheless, preventive maintenance will be the basis to ensure reliability in service and to preserve the value of the film scanner.

This document provides the instructions needed for fast and competent carrying-out of routine maintenance works.

Materials and aids for maintenance can be bought from

Thomson Broadcast and Media Solutions

under the following order numbers:

- Cleaning fluid for the capstan roller (isopropyl alcohol) . 5 108 701 008
- Audio head demagnetization (220 V) 3 121 216 011
- Audio head demagnetization (110 V) 3 121 216 010
- Dustaway (compressed-air cleaning means) 5 108 601 021
- Cleaning cloths 5 001 310 280
- Rack air filter (front) 1 128 725 504
- Rack air filter (rear) 2 128 560 037
- AIS air filter 3 119 101 009
- Gate blast filter 3 149 300 002
- Spare PTR Set (4 pcs) 3 149 900 882
- Spare PTR Holder Set (2 pcs) 2 128 102 117

4.1 RECOMMENDED MAINTENANCE INTERVALS

Thomson recommends the following **cleaning and maintenance intervals:**

Cleaning and maintenance intervals	Prior to each film threading	Every 4-8 weeks	Quarterly	Semi-annually	Every 3-5 years	See section
Light gap and film-guiding edges (optical block)	●					4.4.4
Film drive mechanism		●				4.4.1 and 4.4.3
Capstan roller	●					4.4.2
Projection lamp		●				4.5.2
Defection mirror unit with condenser lens 1, 2		●				4.5.3
Trim filter		●				4.5.4
D-Min filter		●				4.5.5
Filters of the filter wheel		●				4.5.6
Condenser lens 2 and safety shutter		●				4.5.7
Condenser 4 and iris of light control		●				4.5.8
Lens gate assy (optical block)		●				4.5.9
COMMAG audio head		●				4.4.5
COMOPT sound optics / lamp				●		4.6 and 4.7
Rack air filter		●				4.8.1 and 4.8.2
Blowers				●		4.9
AIS air filter change			●			4.8.3
Backup battery (Controller board FY 7201)					●	Service manual

4.2 MAINANANCE TOOL

4.2.1 COMPRESSED AIR NOZZLE

For cleaning the film drive mechanism, Spirit 4K / 2K is equipped with a compressed air nozzle. The the nozzle with tube can be pulled out for cleaning the film deck or drive mechanism.

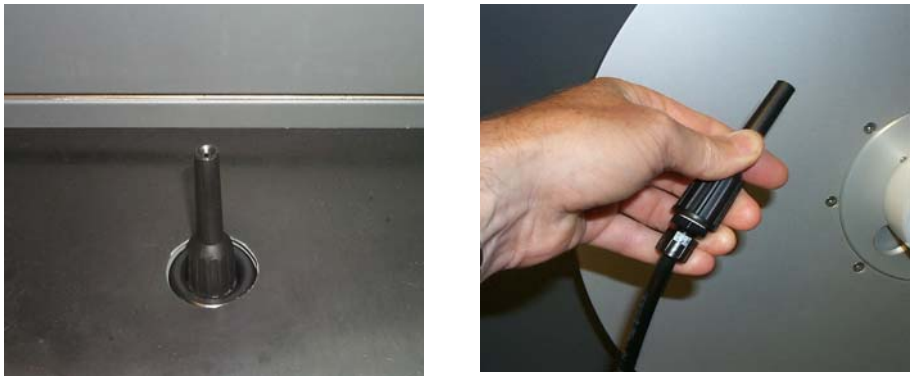


Fig.402: Compressed Air Nozzle

Pushing at the side opens the nozzle. The air pressure is reduced to 3 bar.

4.2.2 TOOL SET

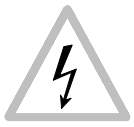
All required cleaning items and tools are supplied with the Basic Accessories FH 7620 (Order no. 0 128 762 000).

Fig.403: Fig.402: Cleaning items and tools

Following parts are included:

Pc.	Designation	Part No.:	Remarks / Use
1	Dust away	5 108 601 021	Pressed-air Cleaner
1	Phillips Screw Driver Size 0	9 000 505 045	Cabling
1	Phillips Screw Driver Size 1	9 000 505 043	Cabling
1	Screw Driver	9 000 505 082	Cabinet Assembling
1	Allan Key 2mm	9 000 505 188	Local control panel
1	Wrench 17x19	9 000 505 134	Leveling Feet Adjustment
1	Glove Cloths	5 001 910 280	Cleaning Optics, Capstan Roller
1	Brush flat form	5 001 916 051	Cleaning Fan Unit
1	Polisher	5 001 910 366	Tool for cleaning the guides of integration cylinder
1	Scraper	1 128 500 059	

4.3 GENERAL SAFETY INSTRUCTIONS



ATTENTION!
Before performing maintenance and service routines, switch off the Film Scanner and disconnect it from the mains by switching off the central power swich or the circuit breaker at the Power Terminal Unit (3-Phase) FH 7030 or (1-Phase) FH 7032!

Prior to starting cleaning routines on the drive mechanism, optical block, capstan roller or audio scanner, make sure that no film is threaded.

For cleaning, always wear gloves and use clean, lint-free cleaning cloths (order no. 5 001 310 280) and isopropyl alcohol (order no. 5 108 701 008)

If work is required **close to the xenon projector lamp housing**, do not start working before it has **cooled down for 30 minutes** - risk of getting burnt.

Ultraviolet Radiation

CAUTION!
High intensity ultraviolet energy exists within the illumination path, generated by the Xenon arc lamp. Protect eyes and skin.

For cleaning the capstan roller use isopropyl alcohol only, never acetone!

Please see also the **Safety Instructions** of the Planning & Installation Manual.

4.4 CLEANING THE FILM DRIVE MECHANISM

All film-contacting parts – such as sprocket wheel, optical block, audio scanner, capstan roller and deflection rollers (see the figure below) – should be cleaned regularly to avoid dirt and emulsion deposits.

It is advisable to perform these cleaning routines at the intervals indicated on the table of section 4.1.

4.4.1 CLEANING THE DEFLECTION ROLLERS

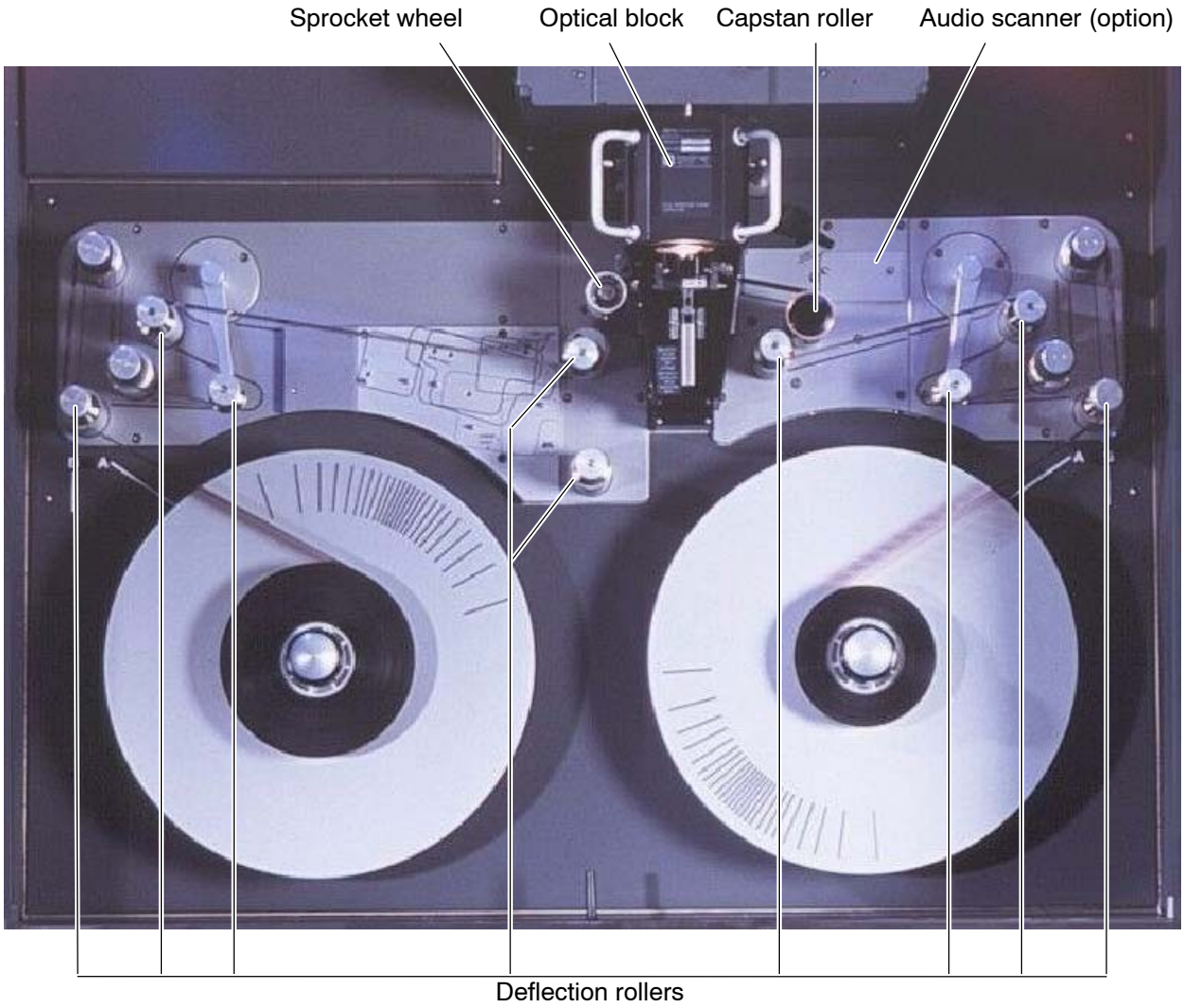


Fig.403: Film drive mechanism

1. Switch off the film scanner. Remove the film from the film deck.
2. Remove the emulsion deposits from sprocket wheel and deflection rollers using isopropyl alcohol and a cleaning cloth.

4.4.2 CLEANING THE CAPSTAN ROLLER

CAUTION!
Clean the capstan roller only in stop mode! Risk of injury!

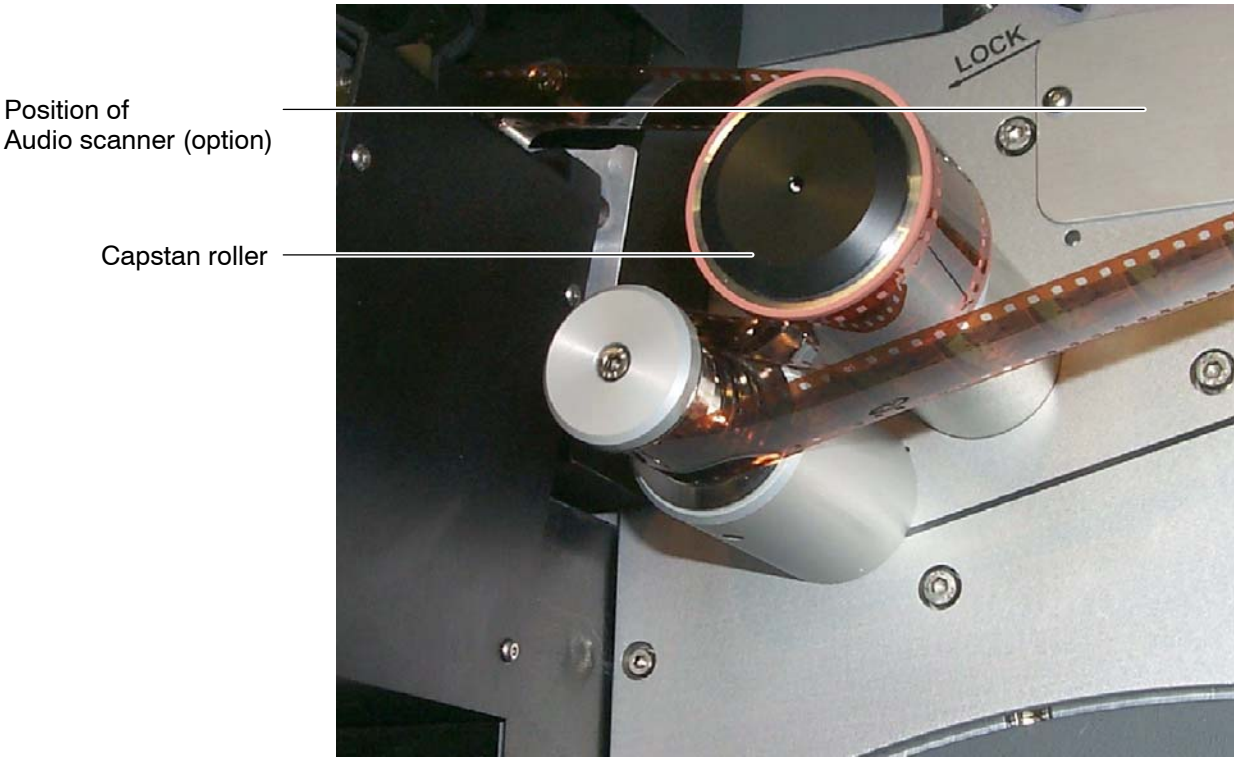


Fig.404: Capstan roller

A **dirty capstan roller** causes picture instability.

1. Remove the film from the film deck.
2. Switch off the film scanner
3. Clean the complete capstan roller surface thoroughly removing all deposits with an isopropyl alcohol moistened cleaning cloth.
   Avoid excessive force on the roller surface! As a cleaning agent, use only isopropyl alcohol and a lint-free cleaning cloth!

   Capstan roller polluted with wax shell be washed with warm (40° ... 60°C) water with washing-up cream until the wax is removed. After drying and as a second step, clean the roller with isopropyl alcohol as usual.

ATTENTION!
Removing the capstan or changing its position affects the picture steadiness, therefore any work on the capstan should be done by Thomson service personnel only.

NOTE!
The capstan roller shall be exchanged regulary after 12 ..15 month of usage.
Spare part no.: 2 126 940 001

4.4.3 CLEANING OR REPLACE THE PARTICLE TRANSFER POLLERS

Particle transfer rollers (PT rollers) are used in the film deck to clean the film during play on both sides of dirt, dust and lint.

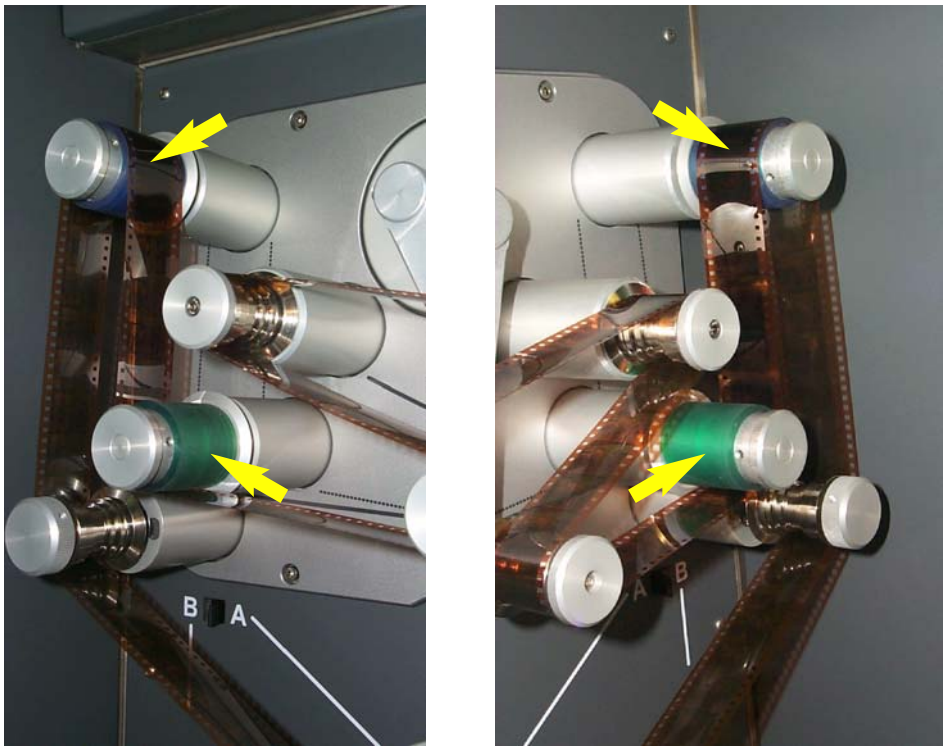


Fig.405: Film threading path with PT roller

1. For replacing or cleaning remove the PT rollers by withdrawing the snap cap of the holder.

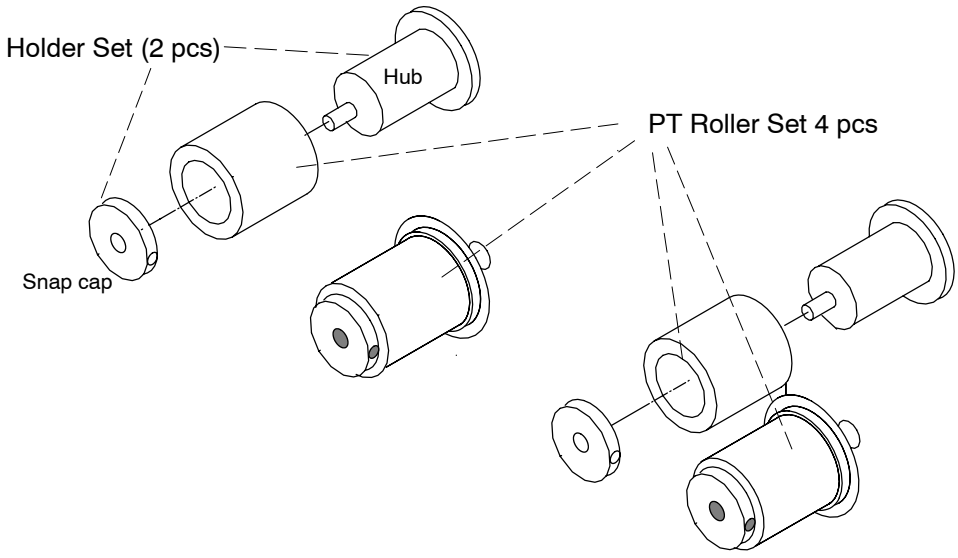


Fig.406: PT roller set

2. Clean the PT rollers in cold water with a rate of 2 - 4 drops mild detergent per liter.

   CAUTION!

   - ***Do not use dishwasher detergent!***
   - ***Do not use hot water as it can cause PTR's to become very sticky and cause excessive adhesion and potential damage to the film.***
   - ***Do not use packaging or other tapes to clean a PTR after it has been washed!***
     Packaging tape will transfer some of its adhesive to the PTR and cause excessive adhesion of the film to the PTR, resulting in damage to the film. Simply wash the PTR's and allow them to dry thoroughly before reinstallation.
   - ***If cleaned properly, PTRs should roll off one another when stuck together.***
     Rollers that stick together without falling off must be rewashed in cold water with a mild detergent.

3. Dry the rollers and re-mount them. It makes no difference which way the rollers are placed on the hub end for end.

Spate Parts:

- Spare PTR Set (4 pcs) Order no.: 3 149 900 882
- Spare PTR Holder Set (2 pcs) Order no.: 2 128 102 117

4.4.4 CLEANING ILLUMINATION SLIT AND FILM GUIDING OF THE FILM GATE

A **dirty illumination slit** causes vertical dark stripes in the picture signal.

Dirty film guides can lead to dirt deposits in the integration cylinder and may cause scratches on the film.

For cleaning the illumination slit and the film guides the film gate has to be removed and the integration cylinder has to be cleaned.

Remove the Film Gate Block

Cleaning the Film Gate Block

Carefully clean the illumination slit, the film guides and all film-contacting surfaces (use a cleaning cloth and isopropyl alcohol). Also clean the ceramic film positioner of the optical block.

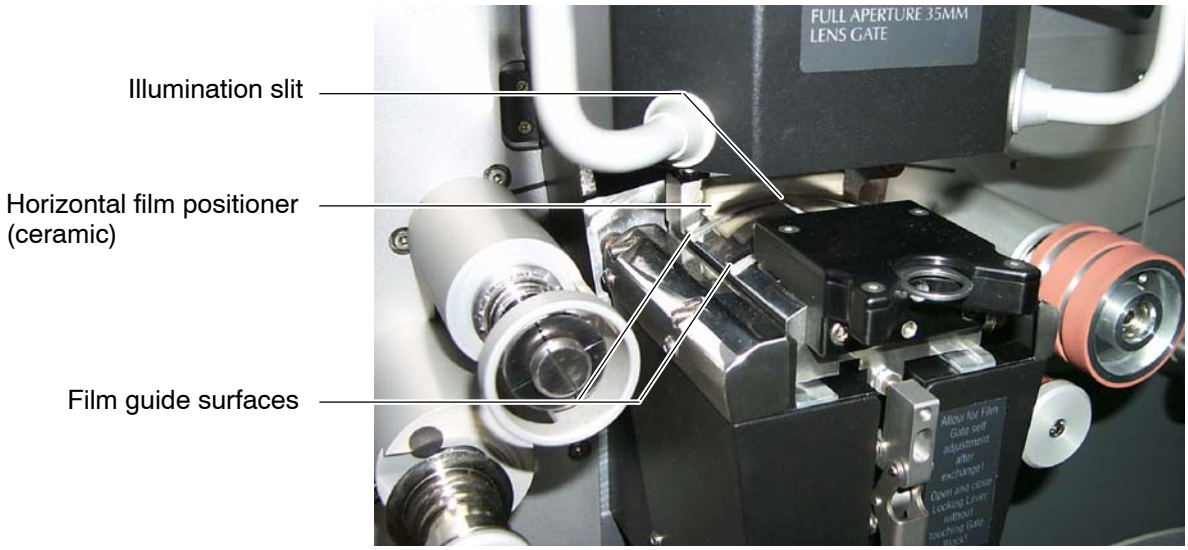


Fig.407: Illumination slit and film guiding

Clean the film guide surfaces if necessary with the polisher or scraper from the standard accessory. **Never** use the coarse (red) part of the polisher!

Performing any cleaning of the Film Block should be done after it has been removed from the Lens Gate. Remove the Film pressure roller assembly prior to cleaning of the rails to avoid getting any dirt in the bearings. While the pressure roller assembly is off, use isopropyl alcohol to clean the outer surfaces of the bearings.

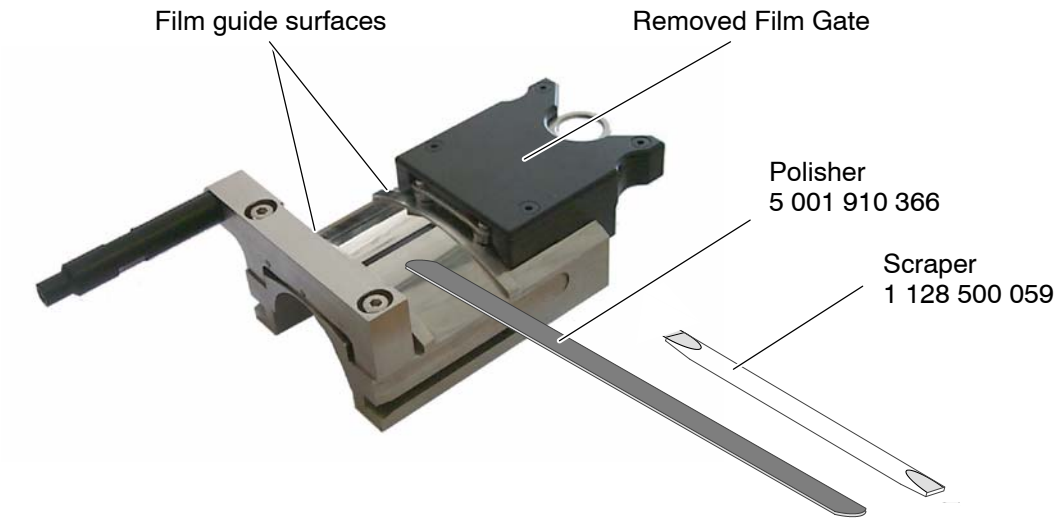


Fig.408: Cleaning film rails with the Scraper and Polisher.

4.4.5 CLEANING AND DEGAUSS THE COMMAG AUDIO HEAD (OPTION – IN PREPARATION)

NOTE!
A dirty or magnetized COMMAG audio head impairs the audio quality.

1. Switch off the film scanner. Remove the film from the film deck.
2. Unscrew and pull off the cover of the audio scanner.
3. Thoroughly clean the surface of the COMMAG audio head to removing deposits using isopropyl alcohol and a cleaning cloth.
4. Switch on the degaussing coil and touch it to the COMMAG audio head.
5. Then remove the degaussing coil delay switching it off, until it is at least 30 cm away from the audio head.
6. Remove dust from the COMOPT scanning elements of the capstan roller with a compressed air jet (Dustaway spray).
7. Fasten the cover of the audio scanner unit.

4.5 CLEANING THE LIGHT PATH

4.5.1 NOTES ON THE CLEANING PROCESS

Turn OFF the machine. Allow for components to cool down before starting

- Lens cleaning solution
- Lint Free Cleaning cloths
- Canned Air
- Cotton Gloves

The figure below shows the light path in the film scanner and provides an overview of the required maintenance parts.

Due to mechanical setup and accessibility it is advisable to perform the following service routines in the order of the section numbers.

Cleaning of the light path is always required when the available light output has decreased perceptibly.

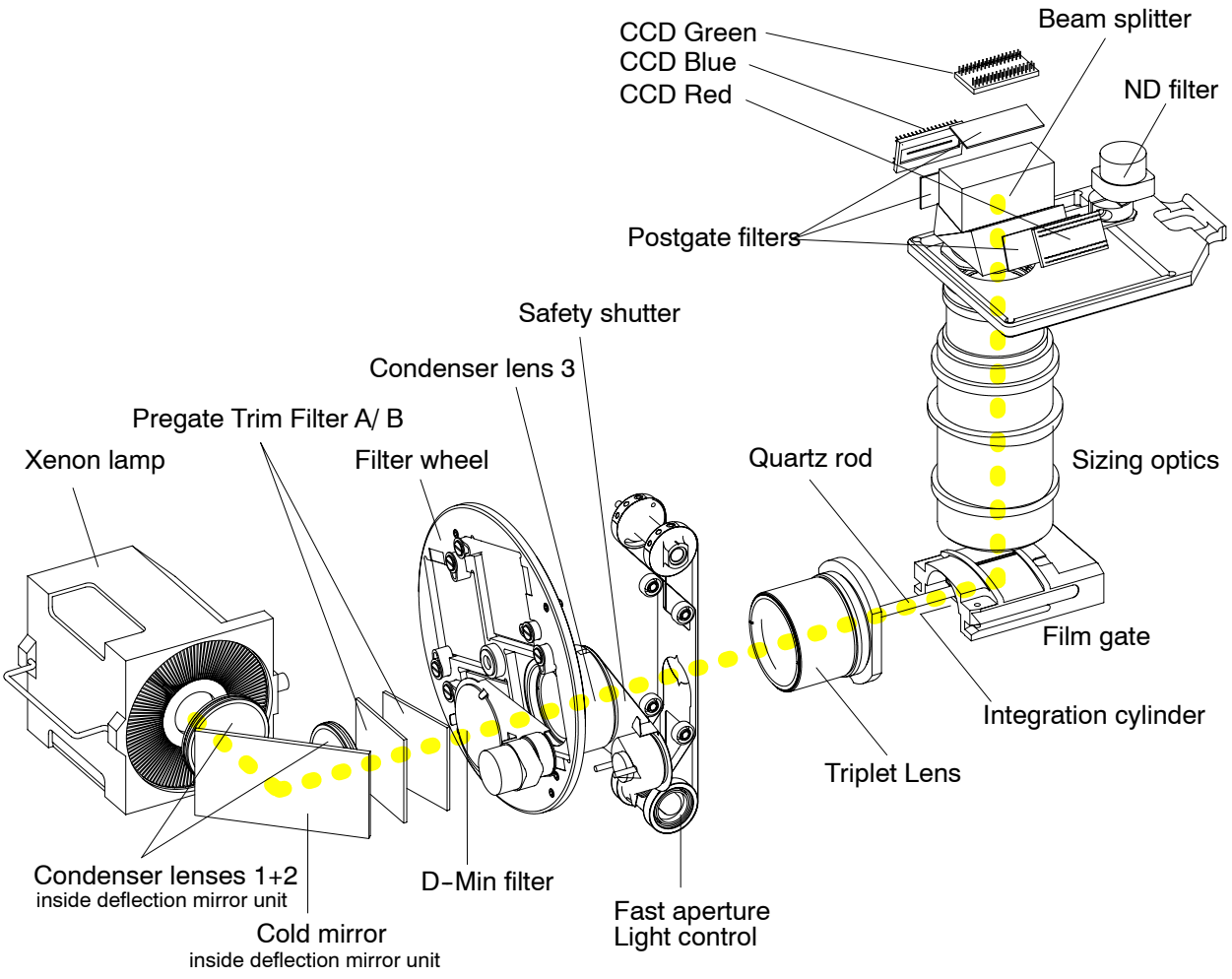


Fig.409: Light path

CAUTION!
High intensity ultraviolet energy, generated by the Xenon arc lamp, exist within the illumination path.

ATTENTION!
Switch off the film scanner before cleaning the light path, and allow it to cool down for 30 minutes (risk of getting burnt in the proximity of the lamp housing!).

NOTE!
Always wear Cotton gloves during any cleaning process.

4.5.2 CLEANING THE PROJECTION LAMP (XENON LAMP)

CAUTION!
Perform all lamp housing routines only with protective goggles and protection gloves. Implosion hazard!

CAUTION!
Allow it to cool down for 30 minutes before opening the lamp house door.

CAUTION!
Lamp replacement - danger of explosion. Don't use other lamp types than Atlas PE700C13-FMVE.

CAUTION!
Do not operate the Spirit 4K / 2K without Xenon lamp. In case no lamp is equipped in the lamp house the igniter transformer will get damaged!

1. Switch off the film scanner. Remove the film from the film deck.
2. Open the rear cabinet doors of the film scanner.
3. **Lamp house** cleaning is not necessary. Checking the Lamp Module, open the door on the lamp house and remove the lamp module using the handle on the lamp.
4. Inspect the lamp cover glass **(Allow time to cool before inspection)** for any dirt or debris. If cleaning is necessary, apply lens cleaner on a lint free cloth or cleaning Q-tip and wipe the surfaces. Check to insure that no residue or streaks are left on the surfaces. If needed re-clean with a fresh cloth or Q-tip. Blow off the surfaces with the canned air.

Spare Parts:	Order Number
● Lamp cpl. (new) FH 7907	000 128 790 710
● Lamp cpl. (exchange) FH 7907 ,	000 128 790 790

Xenon Lamp incl. Lamp House. Pre-mounted bulb in a lamp house, for quick system availability after a light bulb failure.

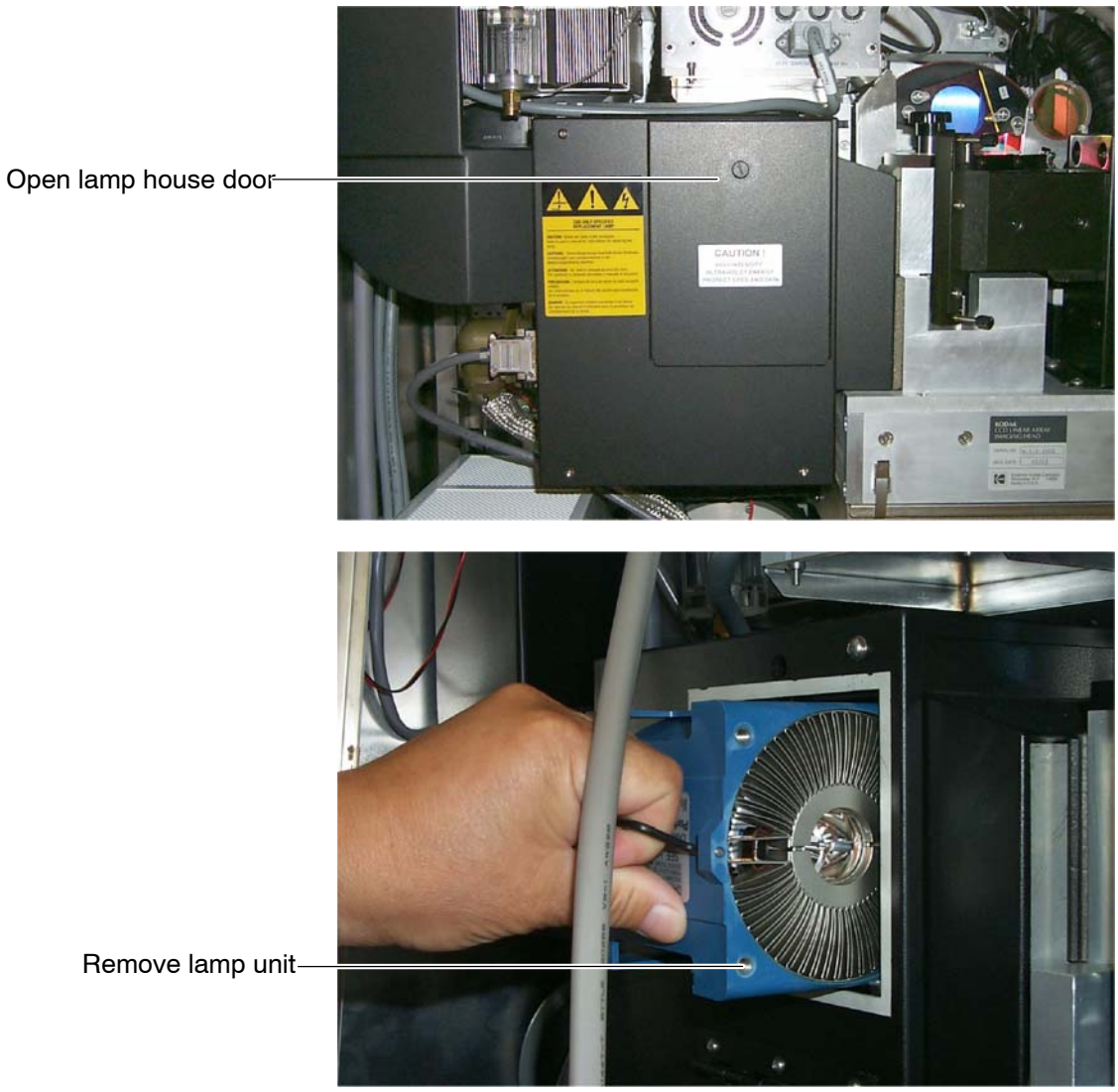


Fig.410: Remove and clean the xenon lamp

4.5.3 CLEANING TILT MIRROR ASSEMBLY (CONDENSER LENS 1 AND 2)

CAUTION!
Shut off the lamp before removing this assembly. High intensity ultraviolet energy, generated by the Xenon arc lamp exist within the illumination path when the assembly is removed. This will also disrupt the cooling air flow to the lamp.

1. Remove the assembly by unscrewing the black knob on the hold down screw, lifting the assembly from the machine, inspect both lens faces. The unit contains condenser lenses 1 and 2 and the cold mirror (see light pass scheme in section 4.5.1).

   If the whole system is being cleaned remove the IR heatsink to allow clearance to access the other components.

   The cold mirror is sealed with a gasket to the assembly to insure a dust free internal chamber. The cold mirror should not need to be cleaned. If cleaning is necessary, apply lens cleaner on a lint free cloth or cleaning Q-tip and wipe the surfaces. Check to insure that no residue or streaks are left on the surfaces. If needed re-clean with a fresh cloth or Q-tip. Blow off the surfaces with the canned air.

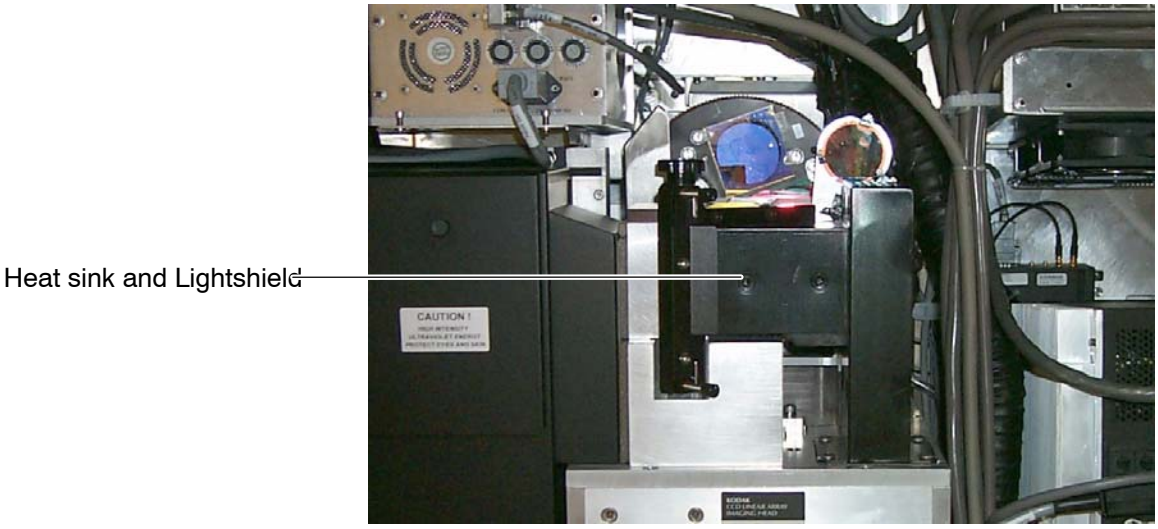


Fig.411: Deflection mirror unit mounted

000 128 790 710 FH 7907
Xenon Lamp incl. Lamp House. Pre-mounted bulb in a lamp house, for quick system availability after a light bulb failure.

2. Clean the condenser with a cleaning cloth (order no. 5 001 310 280).

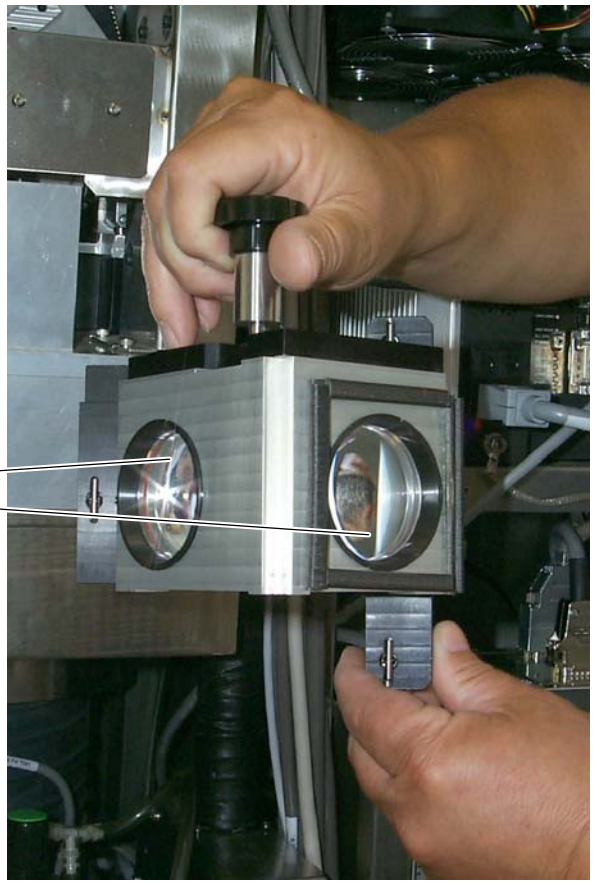


Fig.412: Tilt mirror assembly demounted

Leave the condenser unit out, thus allowing better accessibility to the remaining optical elements.

NOTE!
When reinstalling this assembly it must be registered properly against the two locating pins or the light intensity will be reduced (see Fig.414:). Push tilt mirror assembly up so that the larger pin fits into the corner cutout and the rear pin contact the back surface (see Fig.413:). Apply pressure to the Tilt Mirror assembly to insure proper location and tighten the hold down screw. (see Fig.415:)

Fig.413: Tilt mirror assembly

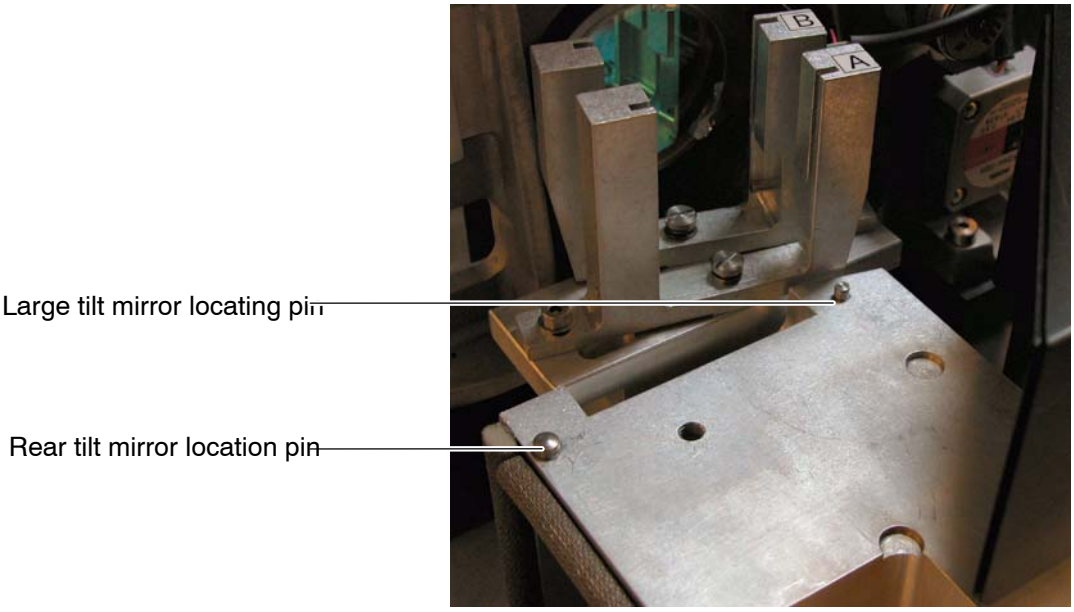


Fig.414: Mounting plate

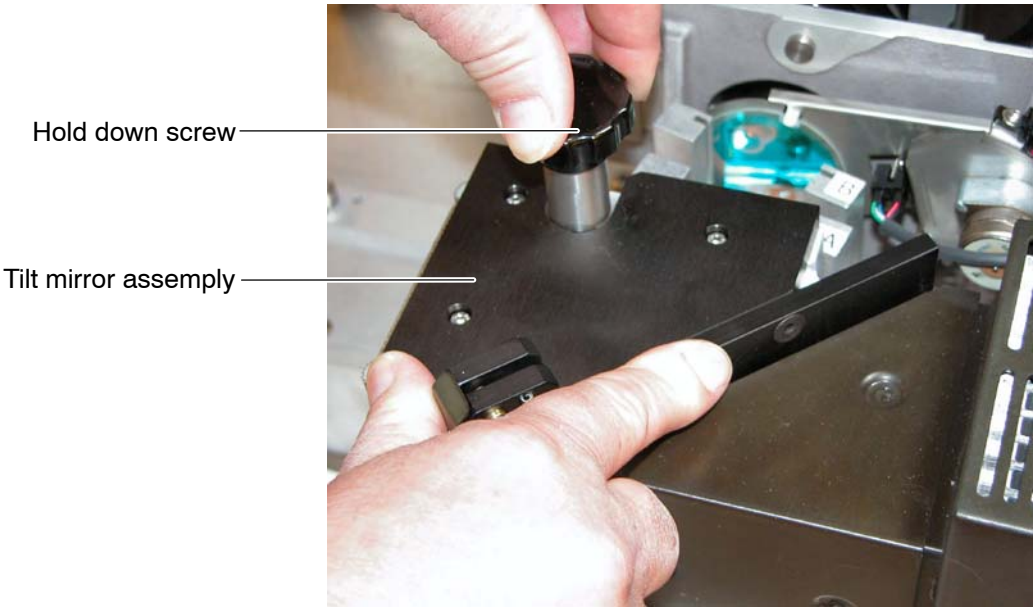


Fig.415: Tilt mirror mounting

4.5.4 CLEANING THE PREGATE TRIM FILTERS

1. Remove the filters one at a time to insure the correct order is maintained. Remove filter A and inspect for any dirt or dust. If cleaning is necessary, apply lens cleaner on a lint free cloth or cleaning Q-tip and wipe the surfaces. Check to insure that no residue or streaks are left on the surfaces. If needed re-clean with a fresh cloth. Blow off the surfaces with the canned air.
2. Reinstall back in the filter holder. Avoid finger prints.
3. Repeat process with Filter B and reinstall.

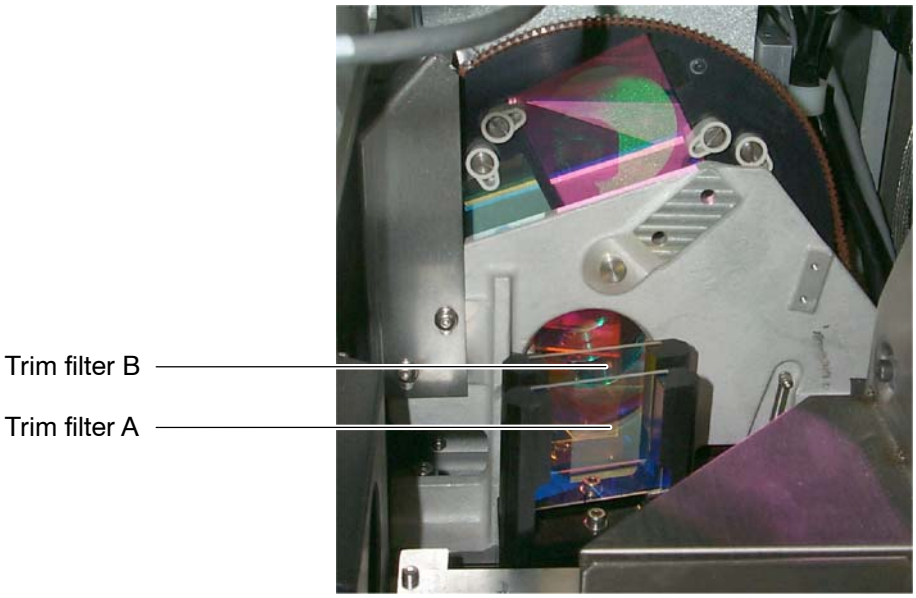


Fig.416: Trimm filter

4.5.5 CLEANING THE D-MIN FILTER

The D-Min filter is located between Trim filter and filter wheel. The filter is mounted on a motor diven sivel arm and can be simply be turned for cleaning.

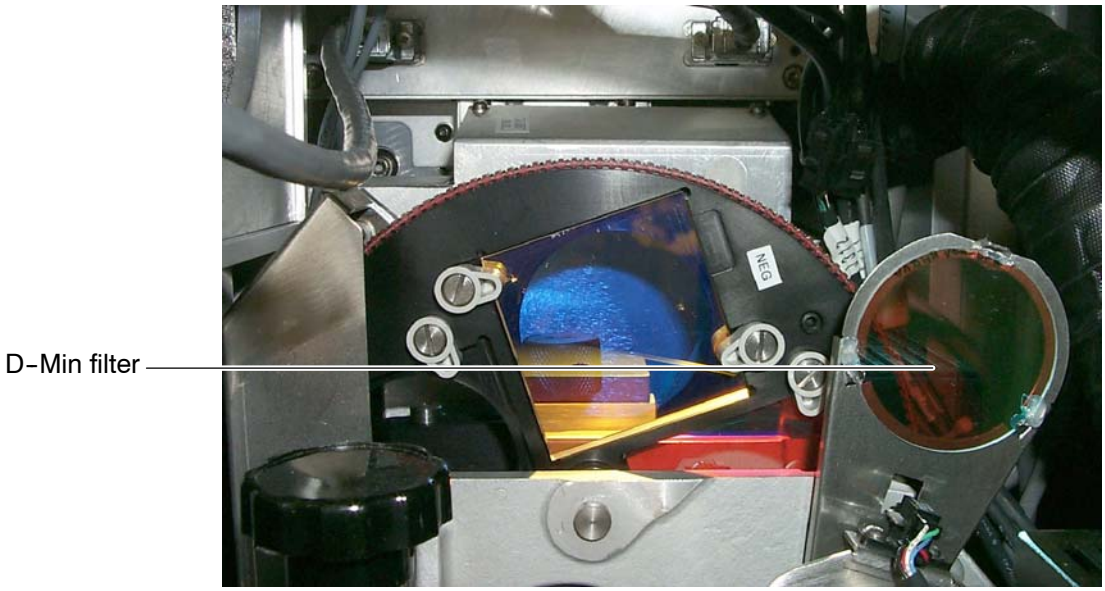


Fig.417: D-Min filter

1. Rotate the filter to the up position to see if cleaning is needed.
2. If cleaning is necessary, clean while in upright position. Apply lens cleaner on a lint free cloth or cleaning Q-tip. Support the ND filter arem while cleaning the surfaces. Check to insure that no residue or streaks are left on the surfaces. Blow off the surfaces with canned air, avoid finger prints.

4.5.6 CLEANING THE FILTERS OF THE FILTER WHEEL

Lower the ND filter arm down to insure the assembly is not damaged during the cleaning of the filters in the filter wheel.

The filter wheel is equipped with three filter (NEG / POS / IMED). The fourth filter position is empty.

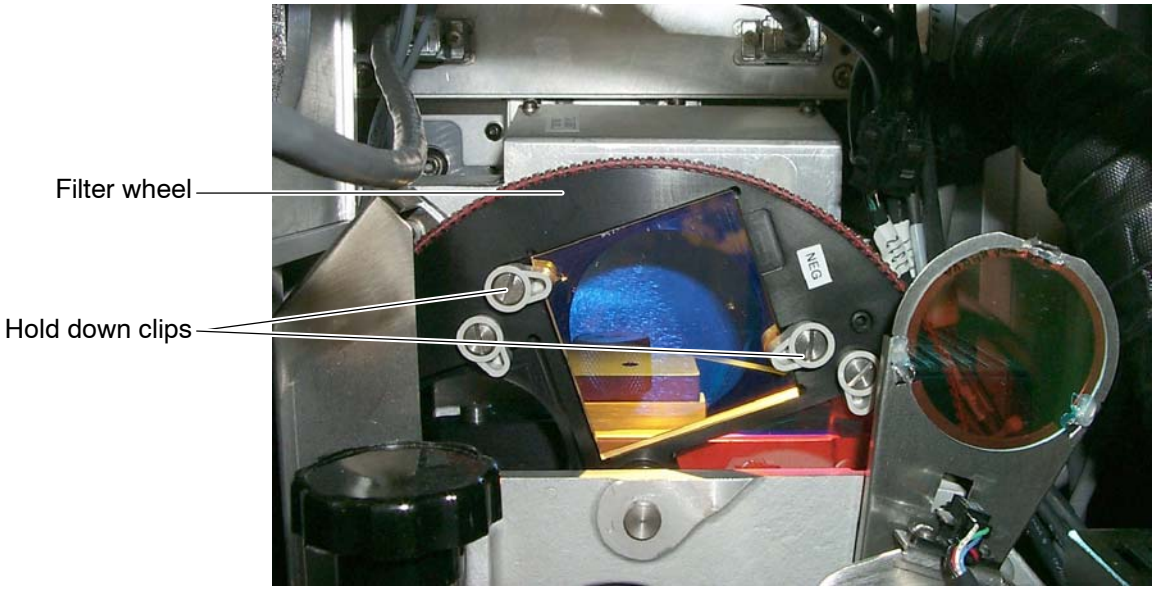


Fig.418: Filter wheel

1. Turn the filter wheel by hand to give access to the filter to be cleaned.
2. Remove one filter at a time to insure the correct order is maintained. Remove Neg. Filter by Lifting and Rotating the hold down clip for each filter. Remove the filter and inspect for any dirt or dust. If cleaning is necessary, apply lens cleaner on a lint free cloth or cleaning Q-tip and wipe the surfaces. Check to insure that no residue or streaks are left on the surfaces. If needed re-clean with a fresh cloth. Blow off the surfaces with canned air.
3. Reinstall filter back in the filter wheel, secure by lifting and rotating the hold down clips.
4. Repeat process with Pos. Filter and Imed Filter.

4.5.7 CLEANING CONDENSER LENS 3 AND SAFETY SHUTTER

Condenser lens 2 (Field Lens) is located behind the filter wheel.

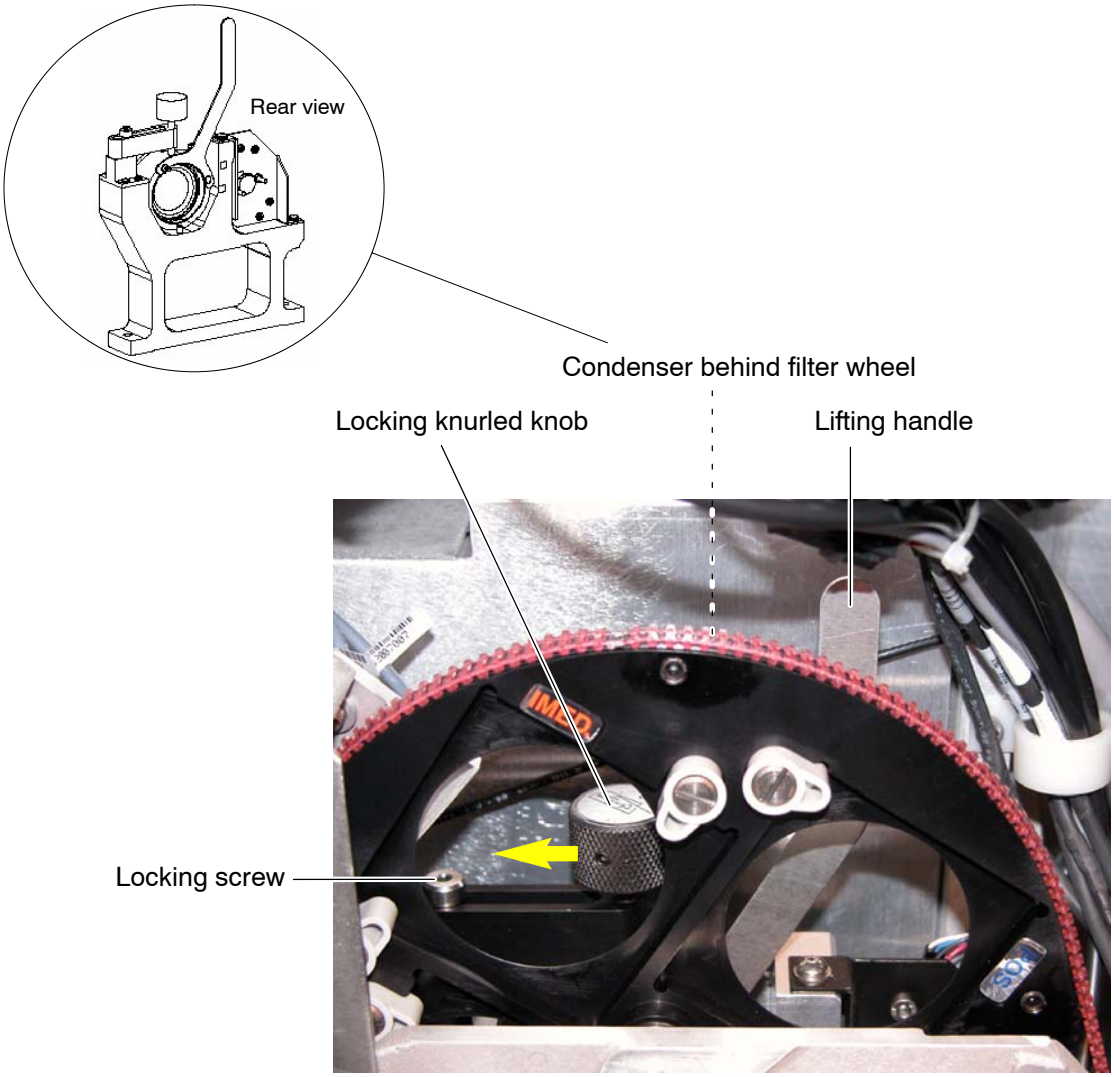


Fig.419: Condenser lens 3

1. Loosen the knurled knob and slid the locking handle to the left. Lift the lens out of its mount with the handle on the right and inspect on behalf of dirt or dust.
2. If cleaning is necessary, apply lens cleaner on a lint free cloth or cleaning Q-tip and wipe the surfaces. Check to insure that no residue or streaks are left on the surfaces. If needed re-clean with a fresh cloth. Blow off the surfaces with canned air.
3. Reinstall the lens, insure that it is properly fit into its mount and slide the knurled knob back over and tighten until the handle torques off.

4.5.8 CLEANING TRIPLE LENS AND IRIS OF LIGHT CONTROL

The Triple Lens (Triplet Barrel assembly) is located in the front of the unit.

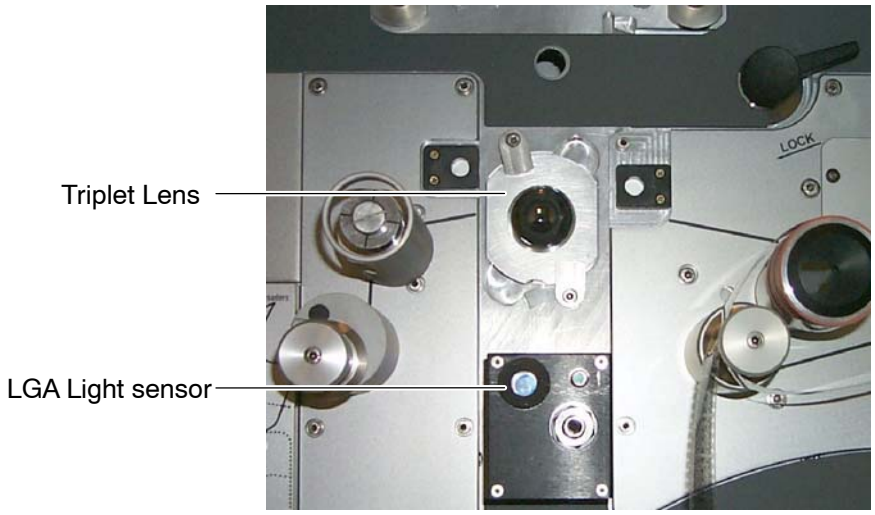


Fig.420: Triplet lens

1. Remove the Lens Gate if installed. The triplet barrel is mounted in the main film deck plate and secured by two hold down clip.
2. Loosen the screws that fix the triplet barrel and remove the assembly.
3. Inspect for any dirt or dust. If cleaning is necessary, apply lens cleaner on a lint free cloth or cleaning Q-tip and wipe the surfaces. Check to insure that no residue or streaks are left on the surfaces. If needed re-clean with a fresh cloth. Blow off the surfaces with canned air.
4. Leave the assembly out, thus allowing better accessibility to the fast aperture light control.

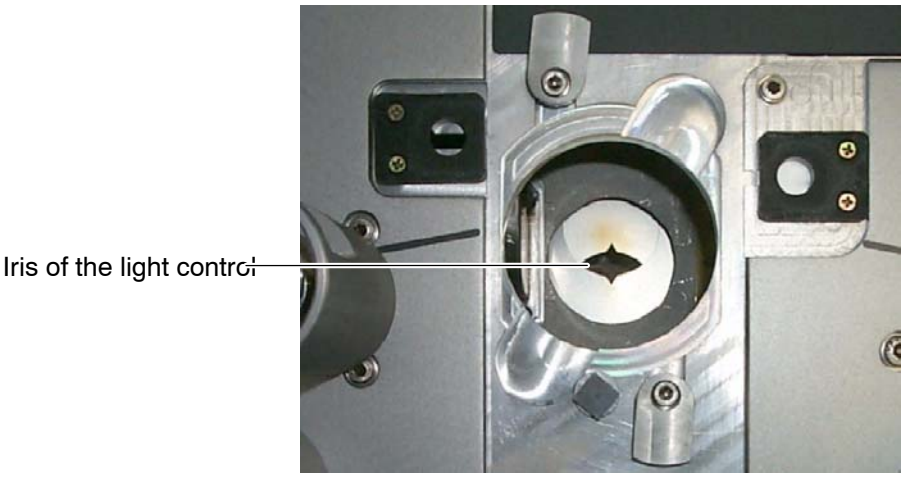


Fig.421: Iris of the light control

5. Check the iris of the light control for dust accumulation.
   Remove dust with or compressed air.
6. Reinstall the lens into its mount, turn back the clips secure the screws.

4.5.9 CLEAN THE LENS GATE ASSY (OPTICAL BLOCK)

Required tools:

- Lens cleaning solution
- Lint Free Cleaning cloths
- Canned Air
- Cotton Gloves
- Mild Soap

4.5.9.1 Daily Cleaning

Always wear Cotton gloves during any cleaning process.

1. Remove the Lens Gate from the machine (as described before).
2. Put the optical block on a table with an anti-slide pad.
3. Clean the lenses of the projection optics with a cleaning cloth.
4. Blow away the dust on the integration cylinder by using a compressed air jet (Dustaway).

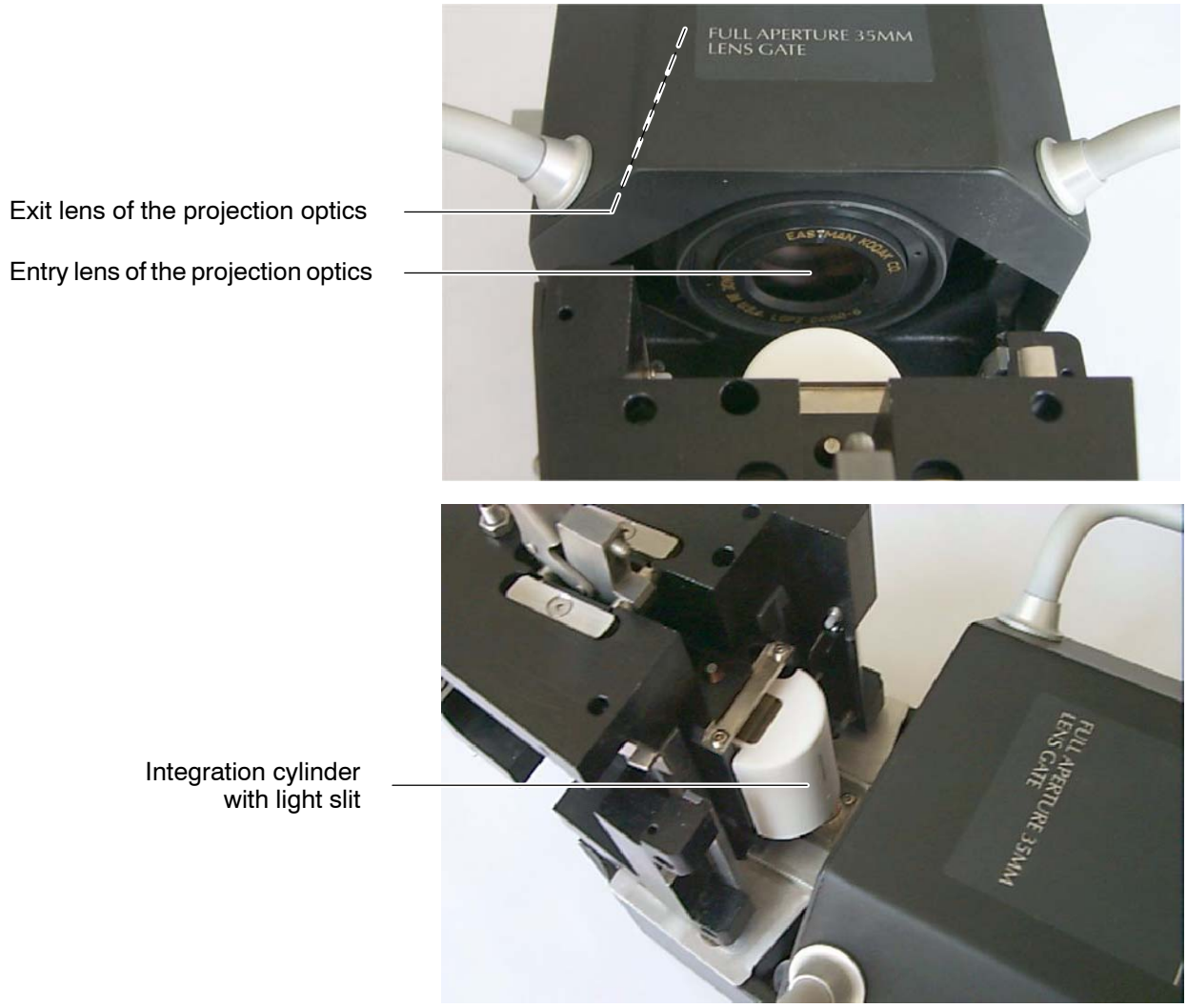

Exit lens of the projection optics
Entry lens of the projection optics
Integration cylinder with light slit
FULL APERTURE 35MM LENS GATE
EASTMAN KODAK CO.
FULL APERTURE 35MM LENS GATE

Fig. 422: Optic block

5. Turn the rear side of the optical block upwards.
6. Clean the quartz rod rear side with a cleaning cloth.
7. Clean the surface of exit port from fibre optic 2 with a cleaning cloth.

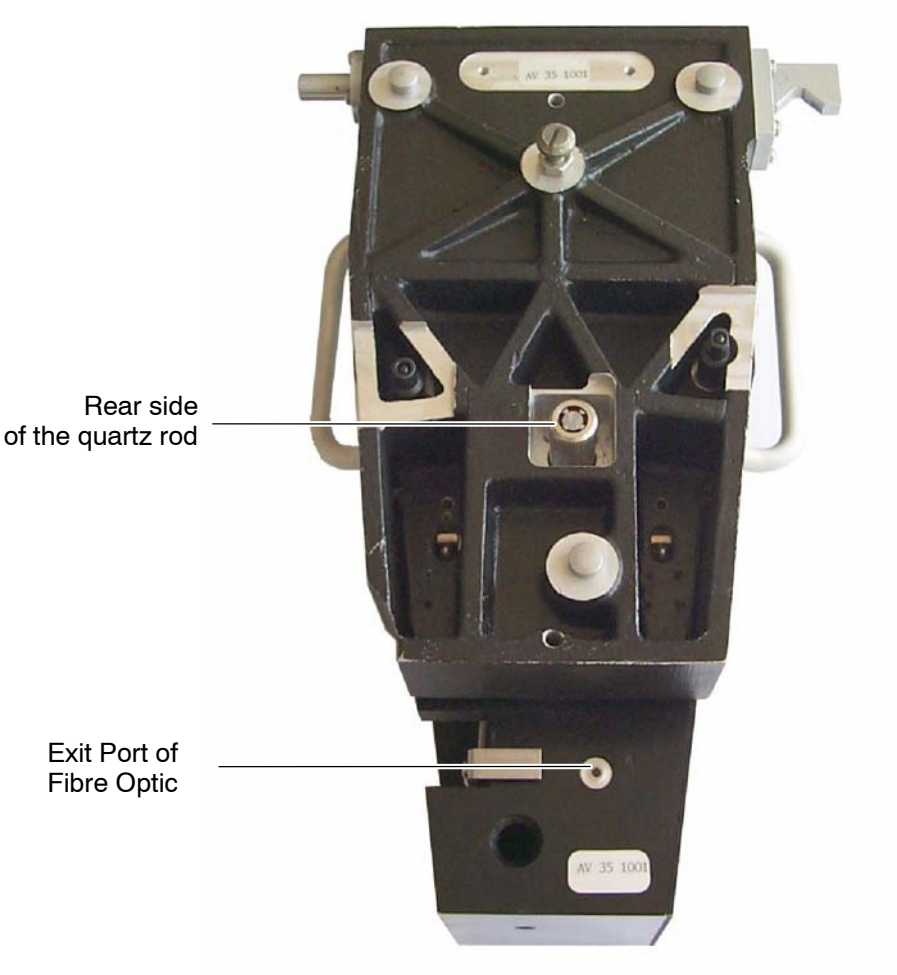


Fig. 423: Rear side of the optical block

8. Assembly of the removed parts is done analogously in reversed order. Finally insert and lock the film gate. Then insert and lock the assembly on the machine.

4.5.9.2 Cleaning by Trained Personnel

NOTE!
The following cleaning procedure is intended for qualified service personnel only!

1. Remove the Film Gate Block from the lens gate assembly, put it aside to be cleaned later on.
2. Remove the spring clip on the illumination end cap by loosening the M3 button head screws. Slide the spring clip off.
3. Remove the illumination end cap by slowly pulling the cap forward till it is free from the glass rod inside the cylinder.
4. Locate the cylinder installation/removal tool. (Each lens gate assembly has a tool included in the lens gate case.) Insert the tool into the lens gate similar to the film block.

Fig. 424: Cylinder installation/removal tool

5. Using the tool, place your fingers at the back of the cylinder and slowly pull it forward. **(Be careful the glass rod is not damaged during the removal process.)** Make sure the illumination cylinder is held down with the hold down clip on the tool. Push downward slightly to insure the cylinder/glass rod is not damaged.
6. Inspect the cylinder for any damage. Blow it out with the canned air. Re–inspect **(DO NOT ever use solvents of any kind)** if cleaning is needed us a mild soap and warm water. The end cap can also be cleaned with soap. Blow both parts off again and allow them to air dry.
7. Inspect the glass rod for any dirt or debris. If cleaning is needed remove the glass rod.
8. Removal/cleaning of the glass rod and Holder. Remove the installation tool; remove the M3 socket head screws that fix the rod holder to the lens gate casting. Slide the rod and holder out and put them aside.
9. Blow out the feed back sensor hole in the middle of the lens gate. Inspect the surface of the optical fiber cable. If needed repeat the process **(DO NOT ever use solvents of any kind).** The feed back port is lined with spectralon to improve reflectivity. If cleaning is necessary remove the fiber optic cable and use a Q–tip. Clean with mild soap and water and blow out with canned air. Reinstall the fiber optic cable.
10. Cleaning of the glass rod. Loosen the cap on the rod holder and slide the glass rod out. Inspect the end of the rod. If there is no damage continue with the cleaning process.

11. If the ends have any chips replace the rod by a new one.
12. Clean the rod with cleaning solution and lint free cloth. Inspect for any streaks or residue. In case clean again.
13. Reinstallation of the rod. Take the rod holder cap off and replace the o-ring on the holder. Slide the rod into the holder until it properly fits into the 4 fingers at the end of the holder. Reinstall the cap, rotate the rod until the grind area is facing to the left with the cutout in the holder at the bottom left. Before tightening the rod make sure it fits all the way to the end, tighten the cap until it bottoms out.
14. Reinstall the rod holder into the lens gate casting using the M3 socket head screws.
15. Replace the installation tool **(Take care not to damage the rod during installation!),** take the illumination cylinder and put it back into the lens gate. Make sure that the rod is aligned before you push the cylinder in. Once it hits the rear stop, remove the installation tool.
16. Replace the end cap by loading it against the right side of the lens gate casting. The rod needs to fit properly in the cap. Once the rod is replaced and the cap is up against the cylinder, reinstall the end cap spring and tighten the screws.
17. Cleaning the lens surfaces, blow off each of the lens surface. Use a lint free cloth, apply lens-cleaning solution and wipe the bottom surface if necessary. Repeat process with upper lens surface. After cleaning, inspect the surfaces to make sure it is free of streaks. If necessary repeat the cleaning process.
18. Locate the Film Gate Block for cleaning. Take the Film Gate Block and blow it off with canned air and inspect the edge guide and film rails. If the film rails and edge guide need to be cleaned, use a lint free cloth and cleaning solution. Rub the rail surface and edge guide until the surfaces are free of dirt. Inspect for any damage on the rails. Blow off the device before inserting it back into the lens gate.
19. In case of larger scratches on the film gate return it to the factory to be repaired.

4.6 CLEAN THE COMOPT SOUND OPTICS (OPTION - IN PREPARATION)

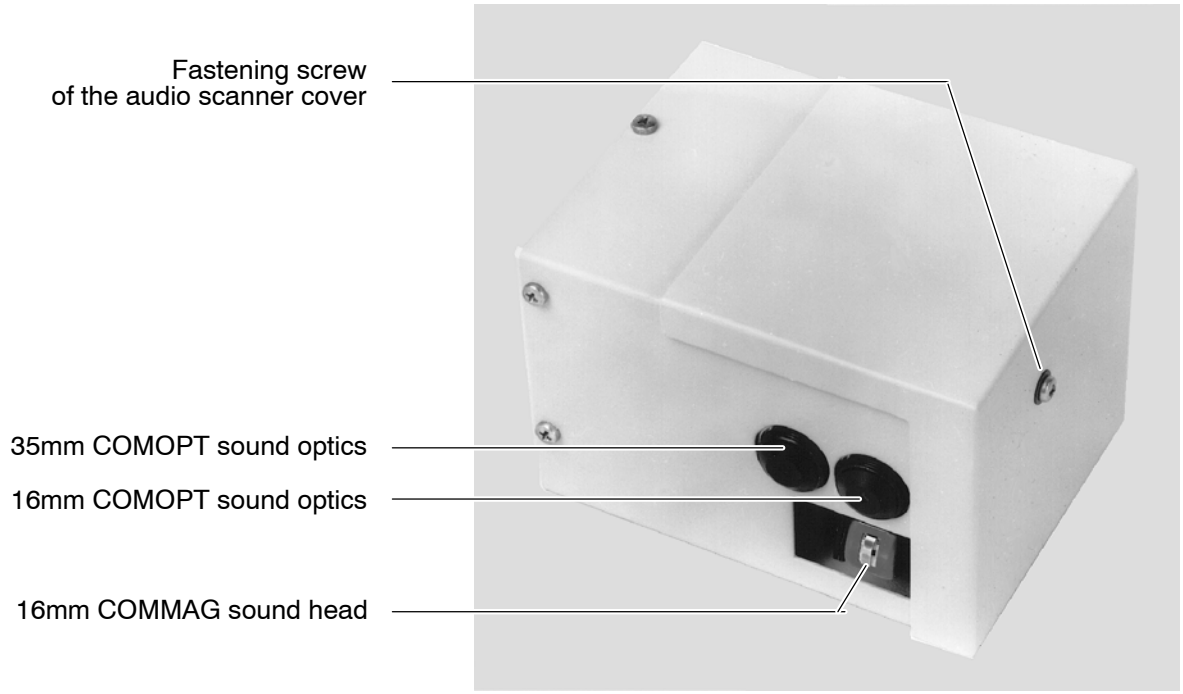


Fig. 424: Fig. 425: Audio scanner of the film scanner

1. Remove the fastening screw of the audio scanner cover and remove the cover.
2. Clean the dirty COMOPT sound optics (light entrance lens as well as light exit lens) with an air jet (Dustaway spray).

4.7 THE COMOPT SOUND LAMP

The audio scanner is equipped with one 6V / 20W halogen COMOPT sound lamp each (1 pc order no. 002 126 696 001) for 16mm and 35mm COMOPT films featuring optical sound track
The corresponding COMOPT sound lamp is switched on automatically (depending on the optical block in use), when COMOPT is selected.

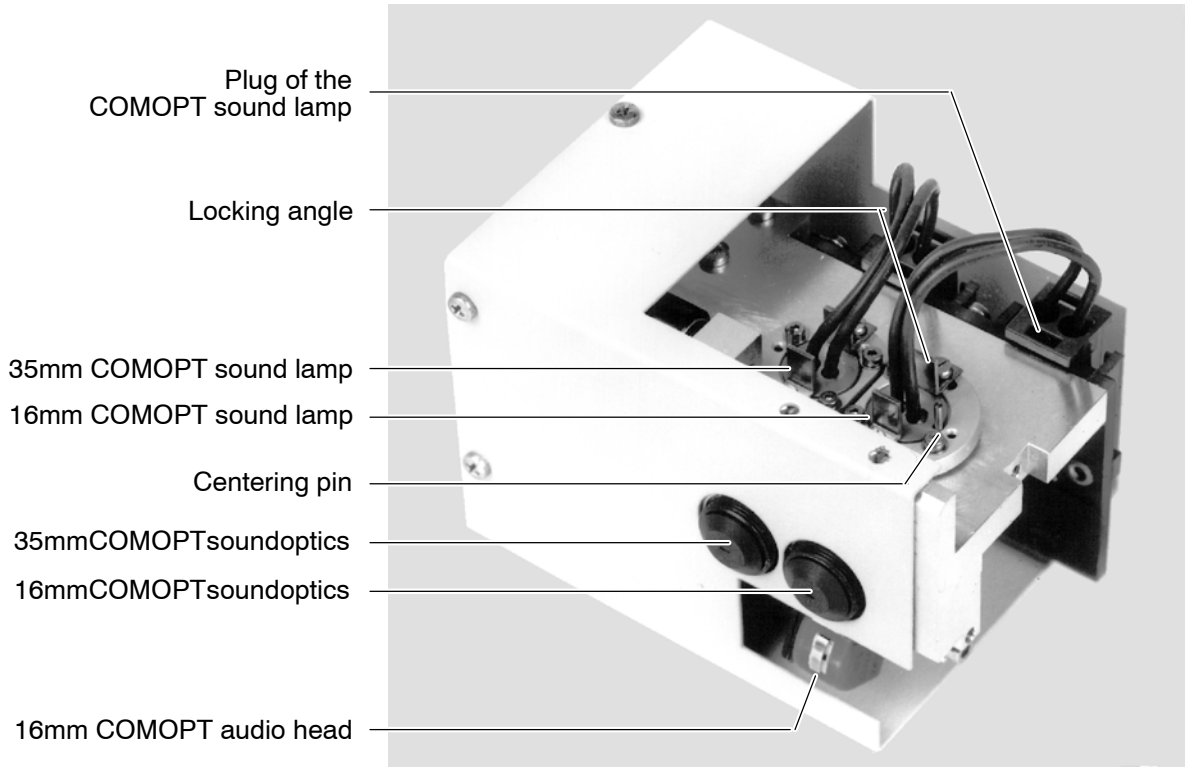


Fig. 426: Audio scanner of the film scanner (opened)

Change COMOPT sound lamp:

1. Remove the fastening screw of the audio scanner cover and pull off the cover.
2. Pull the plug of the COMOPT sound lamp out of its socket.
3. Turn both locking angles at the lamp holder to the side and pull the defective lamp out of the lamp holder (note mounting position).
4. Slide the new lamp all the way into the lamp holder (watch the centering pin, avoid finger prints), close both locking angles and refit the lamp plug.

When changing a COMOPT sound lamp, **slight** input level losses are possible in the respective audio channel.

This slight level loss can be compensated (if necessary) as follows:

Graphical Control Panel

Preparation:

1. Thread a 16mm or 35mm comopt sound signal level film in the film scanner.

   16mm comopt signal level film, 400 Hz order no.: 0 000 993 498
   35mm comopt signal level film, 1000 Hz order no.: 0 000 993 503

2. Press menu button ”Audio Levels” on the graphical control panel.
   The Audio Levels menu is displayed.
3. Press key ”SETUP”.
   Window ”Studio Level Setup” is opened.
4. Select button “Studio Level” and adjust **-3 dBu.**

   ATTENTION!
   Note actual adjustment for later readjustment. Press button Close to exit.

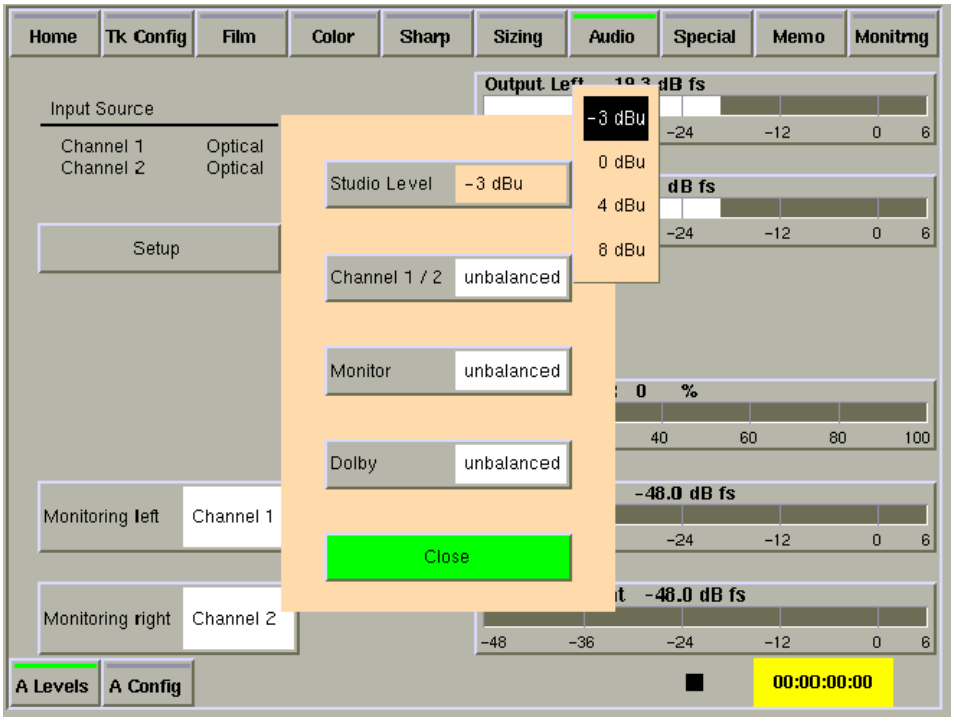


Fig. 427: Audio Level menu with window ”Audio Level Setup”

Select COMOPT sound operation:

5. Press key ”Audio Config” on the control panel.
   The Audio Config menu is displayed.
6. Touch “Source“ section
   Window ”SOURCE Channel 1/2” is opened.

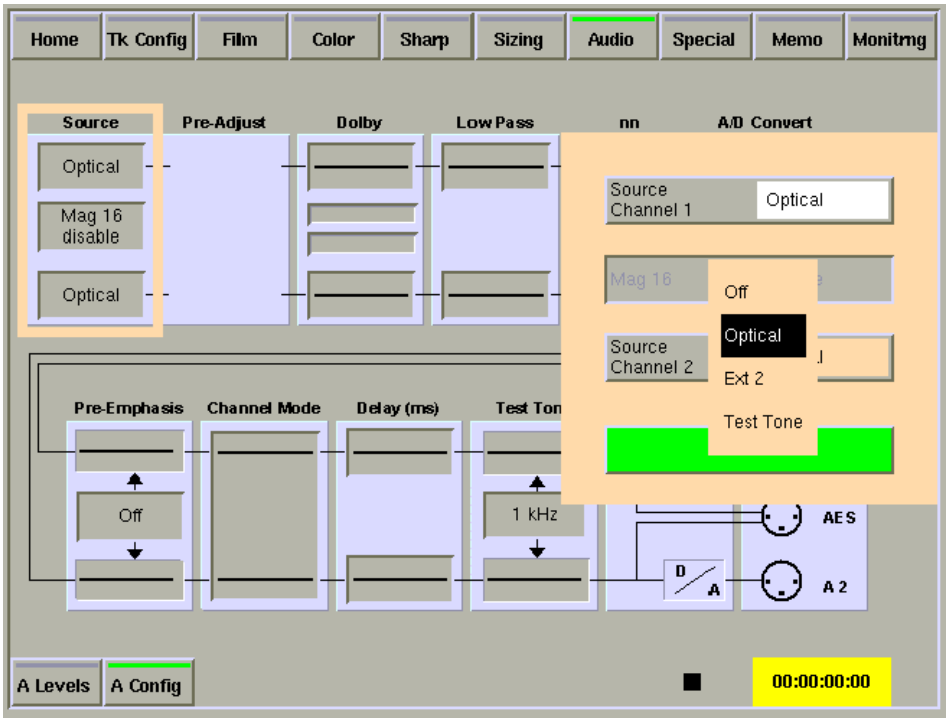


Fig. 428: Audio Config menu with window ”Source Cannel”

7. Press source channel 1/2 and select “Optical” mode for both channels.

Compensate audio level losses:

8. Touch “Pre-Adjust” section.
   Window ”Pre-Adjust” is opened.
9. Start play on the film scanner.

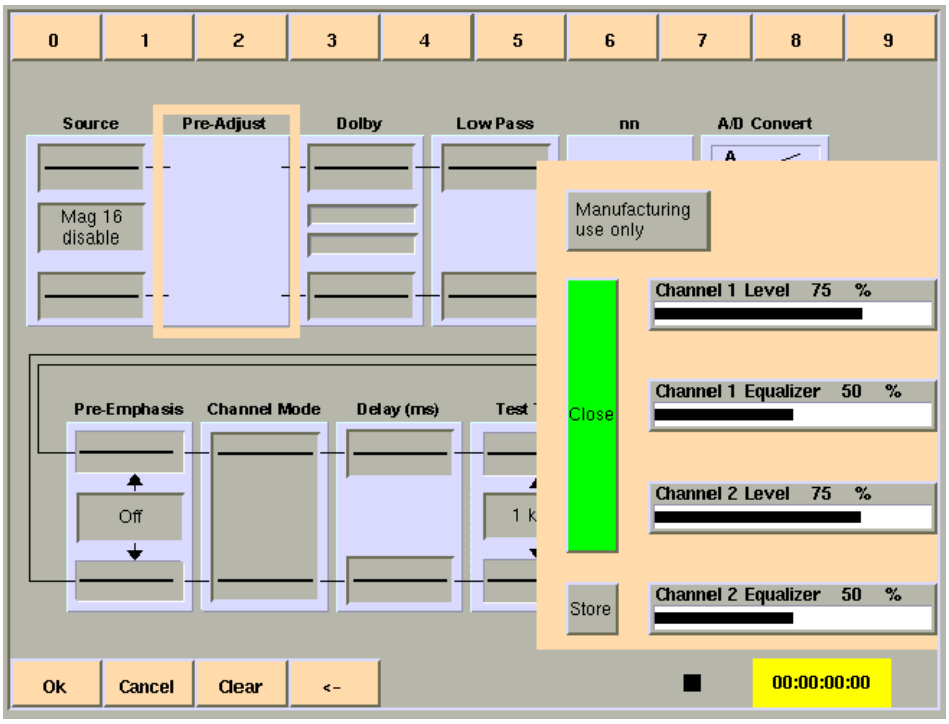


Fig. 429: Audio Config menu with window ”Source Pre-Adjust”

Activate service mode:

10. Press button “Manufacturing only”
    A numeric keypad menu is displayed.

    Enter the 4digit password on the numeric keypad of the control panel. The service mode is active now.

11. Select “Channel 1/2 Level“
    Compensate the level loss of the COMOPT sound using the adjust dial on the control panel.
    With 35mm adjust to 0 dBu
    and with 16mm adjust to +4 dBu
    at the film scanner output AUDIO 1/2 (terminal panel rack 1).

    Subsequently press “Close” button to store the adjustments as unity values (default values).

    Select section “Pre-Adjust again for the following equalizer adjustment.

Adjust the equalizer:

12. Thread a 16mm or 35mm comopt sound frequency response film in the film scanner.

16mm comopt frequency response film	order no.: SMPTE P16-MF
35mm comopt frequency response film	order no.: SMPTE P35-MF

13. Start play on the film scanner.

14. After selecting “Channel 1/2 Equalizer” adjust with the digipot control the frequency response to optimum at the film scanner output AUDIO 1/2.

    adjust with 16mm to ± 2 dB
    and adjust with 35mm to ± 1 dB

    Subsequently press button “Close” to store the adjustments as unity values (default values).

15. Adjust to the original used studio level again.
    That means readjust the adjustment of item xxxx to the original value.

4.8 CLEAN THE AIR FILTERS

Check air filters at least within a period of one to three months depending on the environmental conditions, for dirt deposits and where appropriate, clean or change them. Only clean filters ensure good cooling and optimum operation.

Air filters in the film scanner cabinet:

- Filters 1, 2
  located below Rack 2 (and Rack 3 option – in preparation), front side
  Spare part no.: 1 128 725 504
- Filters 3, 4
  located below Rack 2 (and Rack 3 option – in preparation), cabinet rear side
  Spare part no.: 2 128 560 037
- Filter AIS (cabinet front side)
  Spare part no.: .....
- Filter Gateblast (cabinet rear side)
  Spare part no.: 3 149 300 002

4.8.1 FRONT SIDE FILTERS

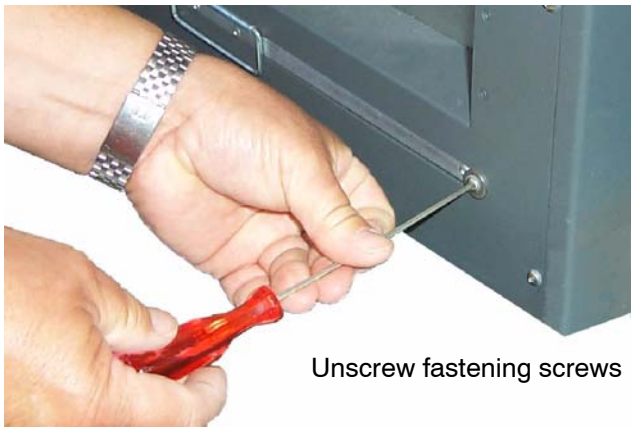
1. Pull on the front side of the film scanner at the gripping ledge of the air filter and remove it. The gripping ledge is located below the rack 2 and rack 3.

Fig. 430: Air filter mat, front rack 2

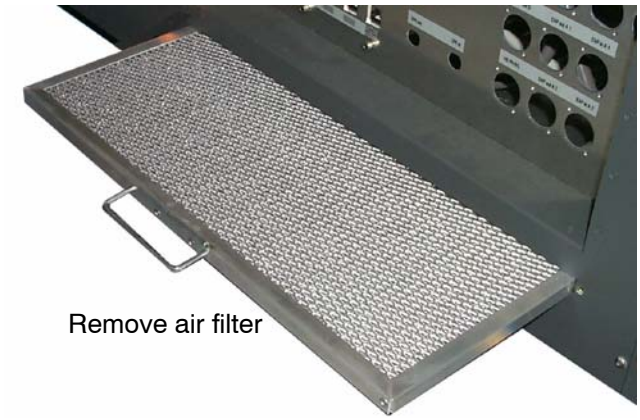
2. Remove the filter completely. Blow out the filter mat.

4.8.2 REAR SIDE FILTERS

1. Unscrew the fastening screws of the rear side filters (rack 2 and rack 3).
2. Remove the filter mat from bottom frame and blow out.



Unscrew fastening screws



Remove air filter

Blow out with compressed air

Fig. 431: Spirit 4K / 2K rear view

4.8.3 AIS FILTERS

Very Important!
Change AIS filter regularly! Danger of heat damage to the CCD sensors!

It is strongly recommended to change the air filter for the AIS (that one between Racks 2 and 3), at least within a period of one to three months depending on the environmental conditions, to ensure that a good air flow is maintained through the Spirit 4K / 2K Film Scanner. A clogged AIS air filter causes the CCD sensors to run hot; this can seriously shorten the life of the sensors!

1. Open the front doors of the Racks 2 and 3.

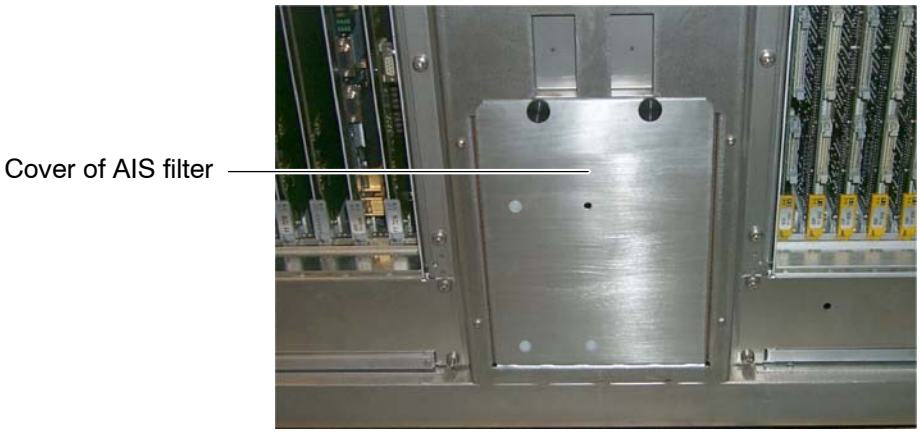


Fig. 432: Cover of AIS filter

2. Unscrew the cover of the AIS filter.
3. Remove AIS filter and exchange it for a new one.

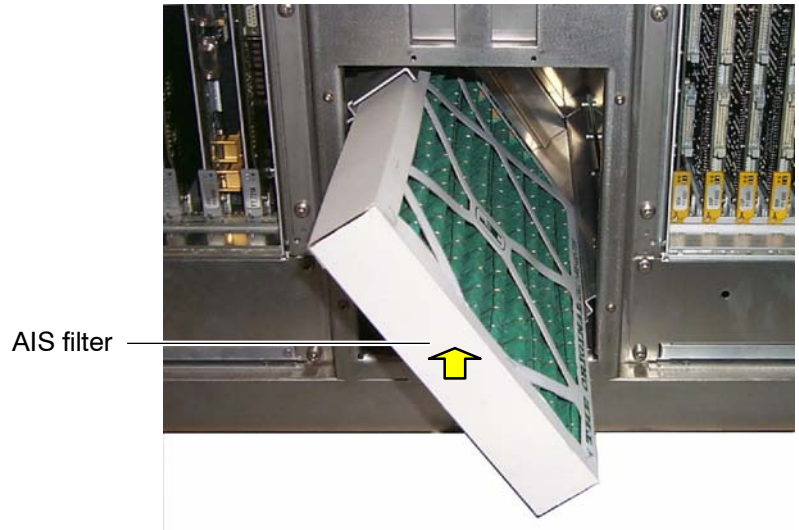


Fig. 433: AIS filter

4. Pay attention to the AIS filter air flow direction. It is marked with an arrow on the filter edge.

ATTENTION!
Do not re-install used or cleaned filter back to front, because dust particles can be sucked into the illumination channel!

4.8.4 GATE BLAST FILTER

1. Switch off the film scanner. Open the rear door of the cabinet. The gateblast filter unit is fastened on the middle of the filmdeck frame.

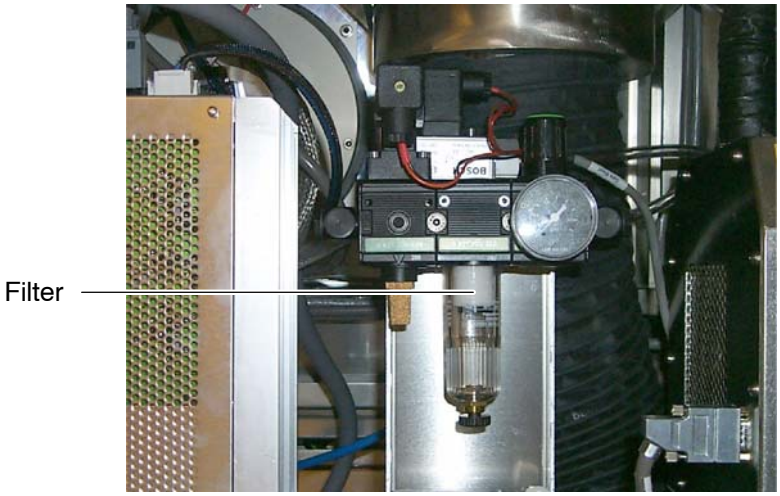


Fig. 434: Gateblast unit

2. First unscrew the air filter housing, then unscrew the air filter and change it. Gateblast filter is included in the filter and battery set.

NOTE!
Check periodically for condensation in the air filter housing, drain it at position "max". For draining use a suitable vessel and open the screw at the bottom of the air filter housing. To prevent short circuits, avoid getting condensation on surfaces.

4.8.5 ADJUST COMPRESSED AIR OF THE GATEBLAST UNIT

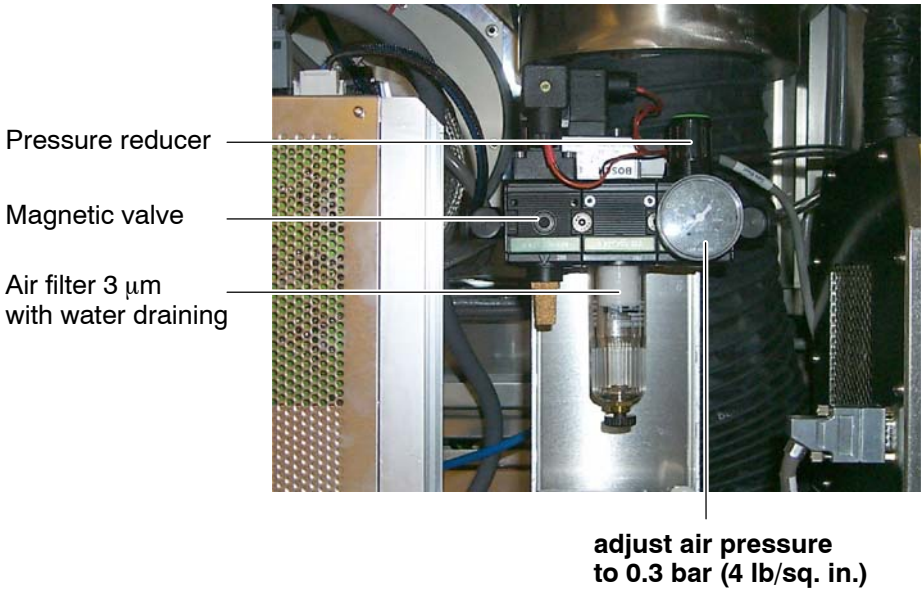


Fig. 435: Gateblast unit of the film scanner

The gateblast unit consists of the a magnetic valve, an air filter with water draining and a pressure reducer.

When the film scanner is switched off or when mains failure occurs, the magnetic valve of the gateblast unit switches off the air supply.

1. Switch the film scanner to play and open the rear doors.
2. Adjust the air pressure at the gateblast unit to 0.3 bar (4 lb/sq.in.).
   Pull the knob of the pressure reducer, adjust the air pressure and press the knob again for locking.

4.9 CLEAN THE BLOWERS

For the film scanner, cleaning of the ventilators is confined to the available fresh air and exhaust air blowers cabinet. The blowers of the internal devices do not require cleaning since they are constantly provided with filtered air and therefore have only slight dirt deposits.

Check the blowers for dirt deposits and where appropriate clean them semi-annually. Only clean blowers guarantee good cooling and optimum operation.

4.9.1 RACK FAN UNITS

Fig. 436: Rack Fan Unit

1. Open the rear door of the film scanner.
   The blower unit for fresh air is located below rack 2, rack 3.
2. Pull off the power plug, unscrew the earth connector.
3. To remove the blower assembly, loosen the four fastening screws on the front and pull out the blower assembly.
4. Pull off and clean the air filter .
5. Clean the blowers with a suitable vacuum cleaner and a dust brush.

4.10 KEY CAP REMOVAL TOOL

How to use the Tool?

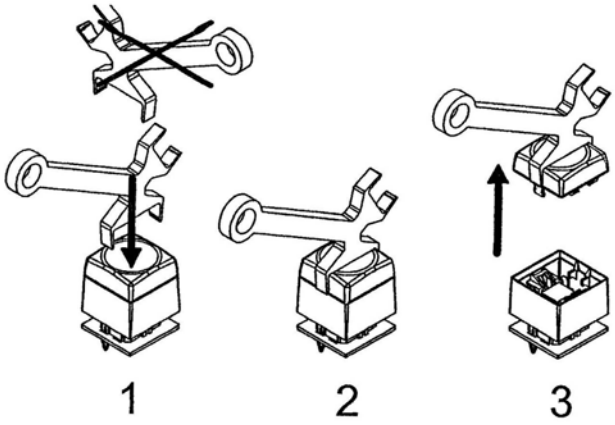


Fig. 437: Key cap removing tool

1. Don’t use the tool crossways!
2. Put on tool to the key cap
3. Remove the key cap

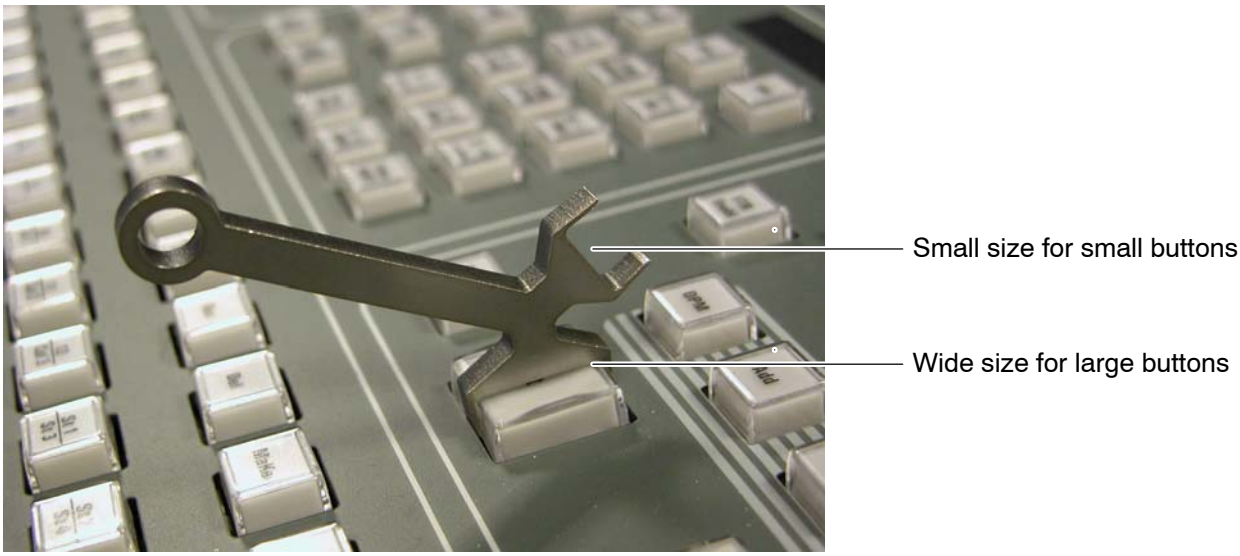


Fig. 438: Tool with small ans wide size